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ABSTRACT

This federally funded project analyzed data from a computerized individualized education plan (IEP) system, to examine factors relating to excellence in special education, with the goal of improving student assessment, evaluation, and outcomes in special education. This final report focuses on three research questions. The first question is whether youngsters with similar characteristics and disabilities placed in different special education settings differ in achievement. Information was collected on the percentage of IEP objectives completed in reading, mathematics, and behavioral areas as well as scores on standardized achievement tests and a behavior scale. The second research question concerns factors contributing to the type of student placement in special education, including student, school, and family variables, and achievement factors. The third research question concerns factors that contribute to and predict academic achievement in special education programs. Findings for each research question are presented for four exceptionalities: emotional disturbance, learning disability, educable mental retardation, and trainable mental retardation. Overall, the best predictors of achievement on standardized reading and mathematics tests were age and IQ. None of the considered variables strongly predicted scores on a standardized behavior assessment or IEP completion of reading, mathematics, or social-emotional objectives. (Contains 34 references.) (SW)

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ED 385 115

EXTANT DATA BASE PROJECT

Final Report
1986-88

Grant No. G008630444 G008630477

Project No. 023TH60051

Suffolk 2 BOCES

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EXECUTIVE SUMMARY

The following document summarizes the findings of a two year study "Factors Related to Excellence in Special Education Using a Validated IEP System as an Outcome Measure" which was funded by the Program for Research in Education of the Handicapped, U.S. Department of Education, Office of Special Education and Rehabilitative Services, Special Education Programs (Grant No. G008630444, Project No. 023TH60051). The grant was awarded to the Board of Cooperative Educational Services, Second Supervisory District (BOCES 2), Suffolk County, New York and was conducted in collaboration with LLW Associates. The results of this effort offer useful insights for practitioners, researchers, and policy-makers at a time of increasing challenge to the structure, organization, and process of special education and of increasing pressure to document quality of education as a whole through close examination of student outcomes.

Background of the Study

Although questions of excellence and equity in education have often focused on students labelled as handicapped, in recent years such concerns have been raised about a wide range of students including those served in remedial programs under federal, state, and local authority, those with limited English proficiency, and the increasing numbers of students labelled "at risk." Albert Shanker (1988) has stated: "If you're real lenient, you might say we're educating 40% of our students. If you're real strict, maybe 10-20%. But no one could soberly claim that we're educating more than 50%" (p. E7).

As a result of both economic and demographic realities, growing attention is being addressed to school failure interpreted in both the individual and institutional sense. Emphasis has been increasingly placed on the development of a system of public education which is flexible and variegated enough to serve a full range of students well. Such an approach rejects the concept that a separate system is needed for those students who are failed by the basic general system and therefore do not thrive in it. It stresses the need for change at both the organizational and instructional levels in order to develop a single system which can respond to the individual needs of all students.

Most instructive in this goal is the cluster of studies that has come to be called the "effective schools research." By identifying and describing school climates which are most conducive to the teaching and learning process, this body of research provides objective information supporting a traditional American belief that good schools can and do enhance students' learning through the actions they take. The effective schools literature indicates that no single factor accounts for a school's success in generating higher levels of student achievement but rather that exemplary pupil performance results from many policies, behaviors and attitudes that together shape the learning environment.

Even though formulas for success tend to differ across studies, the research discloses important similarities among many instructionally effective schools. Three fundamental factors common to effective schools are:

1. Belief in and commitment to student learning;

2. Sense of control over the learning environment or a belief that the learning environment may be managed and improved;

3. Concrete actions taken to reach goals or an exercise of control.

Objectives

The overall purpose of the present research was to propose a model for examining factors related to excellence in special education programs incorporating what has been learned from the general education effectiveness literature and identifying appropriate and valid measures in terms of student outcomes. By targeting special education placement decisions and student outcomes, the initial research based on the model was designed to generate information aimed at increasing the capacity of school systems to address individual student needs more effectively.

The research was based primarily on a computerized IEP system which had been developed by the BOCES 2 Division of Special Education. At the time the project was begun, this extant data base consisted of the assigned and achieved IEP objectives across a full range of subject areas for more than a thousand students of all ages and handicapping conditions served by BOCES 2 over a three year period. Additional demographic information and standardized test scores on the same students was accessed through an ancillary data base. Survey information on the relative importance of different IEP goals as assessed by different special education professionals, on school climates within the BOCES 2 facilities, and on parental involvement was generated during the course of the study. Together, this information was examined using a variety of multivariate statistics including analysis of variance, canonical correlation, discriminant analysis and multiple regression.

Six specific objectives for the two years were:

Objective 1: To determine the degree of importance assigned to different IEP goals/objectives by different types of professionals in special education so that attainment of these goals and objectives can be used as a measure of student achievement.

Objective 2: To determine the concurrent validity of the IEP assessment procedures against a set of standardized tests.

Objective 3: To determine the types of frequency of IEP objectives within major goal area achieved by students of different ages handicapping conditions over a three year period.

Objective 4: To determine if youngsters with similar characteristics and disabilities, who are placed in different special education settings, differ in level of achievement.

Objective 5: To determine what factors, such as school, family, student and achievement variables, contribute to or discriminate type of placement in special education setting.

Objective 6: To determine what factors contribute significantly and predict excellence in special education programs using student achievement as the criterion of excellence.

Results

The findings for Year 1 follow:

- Internal and external experts in special education generally evidenced a high degree of agreement as to the relative importance of individual objectives in three goal areas (reading, mathematics, and social-emotional) for four categories of students (learning disabled, emotionally handicapped, educable mentally retarded, trainable mentally retarded), ages 5 to 16+.

- A high degree of overlap existed in the ranking of the most important objectives in all three topical areas for students designated as mild/moderately handicapped and for students designated as severely handicapped.

- Across all handicapping conditions, there was considerable overlap across age groups as to the most important social-emotional objectives.

- The ranked level of importance of specific reading and mathematics goals changed with age for the learning disabled and emotionally handicapped categories but not for the EMR and TMR categories where considerable overlap across ages was evidenced.

- A significant correlation between completion of IEP social-emotional goals and scores on a standardized assessment of social-emotional behavior gave preliminary support to the concurrent validation of the IEP in this goal area.

- Concurrent validation of the IEP in the reading and mathematics goal areas was not achieved although methodological limitations were identified to help guide future efforts in this area.

- Across all handicapping conditions and ages, more than half of the students completed 50% or more of their assigned IEP goals over a three year period.

- IEP completion rate showed an inverse relation to age although high attrition resulting in small cell sizes require cautious interpretation of this result.

- Comparing across handicapping conditions, IEP completion rate was highest for the TMR group although caution is again in order due to small cell sizes as a result of subject attrition.

In summary, the findings for Year 2 were:

- There were no consistent differences in the achievement of IEP objectives between the three class size options across all handicapping conditions and age groups.
- Of all the entered predictors, school climate and teacher effectiveness together discriminated significantly between the three class size options across the entire sample.
- Within handicapping condition, discrimination between the three class size options was achieved using school climate and teacher effectiveness for the emotionally handicapped group; school climate, administrative leadership and age for the learning disabled group; IQ and age for the EMR group; and IQ, age, and percentage of completed reading IEP objectives for the TMR group.
- The best predictors of achievement on standardized reading and mathematics tests for the entire sample were age and IQ.
- Across the entire sample, none of the considered variables strongly predicted scores on a standardized behavior assessment or IEP completion of reading, mathematics, or social-emotional objectives.

Conclusions

The purpose of the current research was to examine factors relating to excellence in special education using a validated IEP system to measure student outcomes. Conceptual validation of fundamental subcomponents of the computerized IEP system developed by BOCES 2 was achieved. Concurrent validity of the social-emotional goal area of the IEP was supported and important information moving toward validation of the reading and mathematics goal areas was gathered. Pioneering longitudinal data on the rate of IEP achievement by special education students with a wide variety of handicapping conditions and levels of disability was gathered using a data base of more than 3,000 students. Exploration of the proposed model which incorporated traditional predictors of student achievement, factors identified in the effective schools literature and variables traditionally associated with the special education setting and which contrasted the commonly accepted outcome measures of standardized testing and the unique outcome measures of the computerized IEP system made an important first step in examining factors related to excellence in special education.

Overall, the research demonstrates that the BOCES 2 computerized IEP system has considerable promise, both as a tool for educational planning and as an indicator for assessing student outcomes in the special education setting and as a means of bridging the special education/regular education gulf. Nevertheless, much remains to be done to establish the construct validity of the system as a whole before a recommendation to expand its use to a regular education population can be recommended. Discussion of the results in a context of the effective schools literature and other research in special education is offered.

INTRODUCTION

The purpose of this two-year study was to propose a model for examining factors related to excellence in special education programs and to initiate research in this important area. "Maintaining a free and open democracy demands that we actively pursue equity along with educational excellence for children who are handicapped..." (Investing In Our Children, 1985). To some extent the questions parallel those which have been raised with regard to Title I and the education of students with limited English proficiency. In short, once it is acknowledged that all students are entitled to a free appropriate public education, how do you do so in the least restrictive setting? More particularly, in the context of this research, how does one determine excellence in special education settings? Basically, the question focuses on and defines excellence as the capacity of school systems to serve a wider range of students, to be more flexible, variegated and supple, to recognize and be able to address a wider range of students' needs (Gartner, 1984).

This research was designed to derive lessons from the efforts in Suffolk County BOCES 2 and to identify appropriate and valid measures of excellence in special education in terms of student outcomes, and disseminate these findings both within the BOCES system locally and to other school districts throughout the country.

Excellence in Schools

School improvement based on the Effective Schools Research represents a struggle that has now spanned nearly twenty years. The struggle of this vision of school improvement has successfully overcome numerous barriers and has demonstrated, with accelerating frequency, that we can successfully teach all of the children whose schooling is of interest to us.

The cluster of studies that has come to be called the "effective schools research" and related studies on teaching and learning compose the most important body of educational information to be developed in the past two decades. This research is important because it identifies and describes school climates most conducive to the teaching and learning process. In doing so, it has provided a body of objective research that supports the traditional American belief that good schools can and do enhance student learning through the actions they take.

The effective schools research contradicts the conclusions reached by James Coleman in his massive study of Equality of Education Opportunity. The Coleman report concluded that school resources have little impact on student achievement that is independent of the student's family background and socio-economic status.

Educators knew, however, that there were effective schools where students were achieving in basic skills far above expectancy levels. On the other hand, there were non-effective schools where student achievement was far below expectancy levels. So researchers began looking for what caused these differences. Slowly, study after study began to identify and confirm the factors related to higher achievement in basic skills among students in specific schools.

The researchers found that when schools were matched on student background and socio-economic characteristics, differences in student achievement levels corresponded with differences in school management, instructional processes, and learning climate.

The effective schools research is not without critics. Some reviewers of the research have alleged deficiencies in concept and methodology. Despite the shortcomings perceived by some reviewers, however, the body of effective schools research and related studies supports both theory and common sense about what constitutes good schools. Moreover, there is a degree of consistency and rhythm in the research findings across studies differing in design and quality. Most importantly, there is increasing evidence that the effective schools research is useful as a framework for school improvement.

During a major period of the effective schools movement, the researchers' attention turned toward the internal operations of these "effective schools." Ironically, the search for effective schools captured the interests of the social scientists and policy makers but not necessarily the educational practitioners. School leaders, teachers, and local boards of education began to take a more active interest in the effective schools research as the descriptions of the effective schools made their way into the literature and language of the educational community.

This period in the effective schools movement sought to answer the following general questions: "In what ways do effective schools differ from their less effective counterparts?" The research methodology that was used generally consisted of the following:

1. Effective schools, based on measured outcomes, were identified and paired with similar schools in all respects except for the more favorable student outcome profile.

2. Field researchers were sent into these "pairs of schools" and they conducted interviews, observations, and surveys designed to develop as rich a description of the life of these schools as possible.

3. The data were then analyzed with the following question in mind: "What are the distinctive characteristics of the effective schools that seem to set them apart from their less effective counterparts?"

What emerged from the field research were descriptions of certain characteristics of these schools that seem to describe how these schools were able to maintain the "exceptional status." Listed below are the five factors that Edmonds described in his earlier research:

1. the principal's leadership and attention to the quality of instruction;

2. a pervasive and broadly understood instructional focus;

3. an orderly, safe climate conducive to teaching and learning;

4. teacher behaviors that convey the expectation that all students are expected to obtain at least minimum mastery; and

5. the use of measures of pupil achievement as the basis for program evaluation.

Since that original listing, many other studies have cross validated the original findings. Some of the more recent studies have added additional factors and others have sought to make the original Edmonds factors more explicit and more operational. New studies have also looked closely at elementary schools, as did Edmonds in his original research. Other, more recent studies, have also taken the characteristics or factor theory of the effective school to the secondary levels, as well. In addition, the researchers have now documented the existence of the correlates in settings other than those that were characterized as serving primarily economically poor and largely minority student populations. Finally, the research has been expanded to include studies from other cross-cultural settings, with England represented most frequently.

What are the major conclusions that seem to emerge from this expanding array of studies of the organization and operation of these effective schools? First, the more effective schools do share a describable list of institutional and organizational variables that seem to coexist with school effectiveness when it is defined by measured student mastery of the intended curriculum. Second, these core factors seem to be present across the various studies. Third, the effective school can and generally does stand alone even among its counterparts in the same local school district. The major implication being that the institutional and organizational mechanisms that coexist with effectiveness are attainable by the single school and one school at a time. This suggests that effective schooling is within the grasp of the teachers and administrators that define the teaching community of the single school. With the publication of these descriptions of the effective school, practitioners and community members began to take a more active interest. It became clear that if some schools could organize themselves to achieve these extraordinary results, then more could. The important question began to refocus itself around how could the knowledge about these effective schools become the basis for the purposeful transformation, through planned change program, for even more schools.

Importance of Effective Schools Research

The effective schools research is, without doubt, having a profound impact on the quality of teaching and learning. Because of it, we now have a reliable data base on the basic differences between effective and non-effective schools.

This body of research is so important and so basic to the improvement of education that a knowledge and understanding of it has become an essential part of the professional literacy of every school administrator and teacher.

The research is especially significant because it not only shows that important determinants of student achievement lie within the control and management of the schools, but it also provides a research base for assessing and altering the learning climates of specific schools. It is vital that school officials, teachers, and others devising plans for school improvement have available the results of this large body of research on effective schools.

Fundamental Factors Common to Effective Schools

The effective schools research indicates that no single factor accounts for school success in generating higher levels of student achievement. The research shows that exemplary pupil performance results from many policies, behaviors, and attitudes that together shape the learning environment.

Formulas for success tend to differ across studies, yet the research discloses important similarities between many instructionally effective schools. Three fundamental factors common to effective schools become evident from the research.

1. a belief in and commitment to student learning;
2. a sense of control over the learning environment; a belief that the learning environment may be managed and improved; and
3. concrete actions taken to reach goals; an exercise of control.

Elements Common to Effective Schools

The research has identified specific elements common to effective schools. Researchers found that when these elements were present to an appreciable degree in a school, student achievement was above expected levels. Conversely, they found that when these elements were absent to a substantial degree, student achievement was below expected levels. The elements common to effective schools, therefore, comprise a framework for examining the strengths and weaknesses of a specific school and provide a guide for developing a program of action to improve the learning climate of that school.

Leadership

A school's effectiveness in the promotion of student learning was found to be the product of a building-wide, unified effort which depended upon the exercise of leadership. Most often research depicted the building principal as the key person providing leadership to the school. The principal in an effective school:

1. is assertive in the instructional role;
2. is goal and task oriented, action oriented, and creative in approach;
3. is well-organized and delegates responsibility well;
4. sets and communicates high expectations for student and staff;
5. defines and communicates policies well;
6. visits classrooms frequently and purposively;
7. promotes continued staff in-service training;

8. is highly visible and available to staff and students;

9. provides strong support to the teaching staff by minimizing outside factors that would disrupt the learning process; and

10. is adept at developing positive parent and community relations.

Teachers

It is in the classroom where learning primarily takes place. All other elements of effective school organization are ultimately directed at making the basic learning system as it is applied in the classroom as effective as possible. Research findings focus on the importance of classroom teachers. Teacher characteristics, behaviors, and understandings important to effective teaching are:

1. high verbal and conceptual ability;

2. a concern for upgrading professional skills;

3. knowledge of the structure and substance of the content area being taught;

4. understanding of principles of learning;

5. understanding of the special learning characteristics of the students being taught;

6. more time spent actively teaching - The ratio of active teaching time to time spent by students on seatwork is 2 to 1 in high achieving schools compared with 1 to 2 in low achieving schools;

7. less "busy work" and study time - In less effective schools students are given more time to study, while teachers often graded papers or performed administrative tasks;

8. more and varied learning activities;

9. lower absenteeism - Researchers have found a negative relationship between teacher absenteeism and student achievement; and

10. well-coordinated and close working relationships with supplemental staff.

Environment

The third element found by researchers to be common to effective public schools was environment. Environmental factors found in effective public schools include:

1. a purposeful and orderly school climate;

2. clear, firm, and consistent discipline - discipline policies that are plain and concise;

3. a family-like atmosphere of cooperation and caring;

4. few classroom interruptions;

5. parents that are interested and concerned about their children's schoolwork; parent initiated involvement in improving schools;

6. positive community relations; actions taken to make parents feel welcome at school;

7. quality facilities and materials used well; and

8. a well-kept school plant with well-maintained grounds.

Program

Research has also added much to our knowledge regarding the effectiveness of school programs and how teaching techniques can be effectively applied to meeting the needs of all students. In higher achieving schools:

1. The instructional program is goal oriented and human and material resources are directed toward those goals.

2. There is an effective system for assessing and monitoring student progress that enables professionals to evaluate growth in particular skills.

3. Teachers provide prompt feedback to students regarding their progress toward specific learning objectives. Incorrect responses are corrected and reinstruction provided. Correct responses receive immediate positive reinforcement.

4. The level of instruction is appropriate to the learner. Care is taken to assure that new material is not introduced until prior material is sufficiently mastered.

5. Basic skills are emphasized and there are specific plans to upgrade proficiency in basic skills areas and to combat learning difficulties.

6. Students are grouped effectively and flexibly often on the basis of objective criteria such as commercial tests in reading and mathematics. Teachers are more likely to divide their classes into three or fewer groups.

7. Time is managed effectively; there is more active learning time. Teachers in effective schools devote more of their time to teaching the whole class and less time in small group instruction than teachers in less effective schools.

8. Lessons are continuously adjusted to students' needs.

Assessment and Revision

The concept of assessment and revision was found to be an important element common to effective schools. Periodic examination and adjustment help keep the school staff sensitive to student's needs and amenable to program adjustment designed to meet those needs. Effective schools:

1. Have systematic programs for assessing and monitoring students' progress toward specific learning objectives. Test results are thoroughly reviewed by teachers and principals and, when appropriate, test results are used to modify the instructional program.

2. Communicate and report student progress to students, parents, and community in meaningful and understandable ways.

3. Periodically evaluate and assess their own effectiveness. Staffs are accepting of the concept of accountability and accept test scores as a valid index of their own teaching effectiveness.

4. Consider the design of the instructional program and planning for instructional improvement as a shared responsibility. Typically, a cooperative decision-making process is used to effect program improvement at the local school level with consideration given to both district and school priorities.

5. Focus the decision-making process on problem solving. Conflicts are approached in a positive way with staff members involved in helping to resolve the issue.

6. Have a dynamic program open to further improvement.

Conclusion

When we began to address the problems of special education effectiveness, we believed that if schools were to change their practices based on the research findings, research should be used as a guide to the processes as well. We, therefore, reviewed three interrelated bodies of research for the purpose of identifying the lessons to be learned. The three areas of research we reviewed were grounded in our notion of school change. First, since school change could be thought about as "people change," we examined the research on effective staff development. Second, since school change could be thought of as organizational change, we looked at the literature on effective organizational development, especially as applied to the school. Third, whether school change is to be thought of as people change or systems change, we were clearly approaching it as planned change. Thus, we reviewed the literature on planned change. Fortunately, the lessons to be learned from the various research added up to the same general conclusions. Among the guiding principles, we concluded that creating more effective schools must:

1. preserve the single school as the strategic unit for the planned change;

2. principals, though essential as leaders of change, could not do it alone and, thus, teachers and others must be an integral part of the school improvement process;

3. school improvement, like any change, is best approached as a process, not an event, thus leading to our notion of creating a permanent change in the operating culture of the school to accommodate for this new function called continuous school improvement;

4. the research would be useful in facilitating the change process, but it would have to include suggestions of practices, policies, and procedures that could be implemented as a part of the process; and

5. finally, like the original effective schools, these improving schools must feel as if they have a choice in the matter and, as importantly, they must feel as if they have control over the processes of change.

Two major conclusions can be drawn from the lessons learned from research in school excellence. First, the literature on successful change clearly has established that some strategies of planned change do, indeed, work better than others. Second, the process of change based on the effective schools research takes time, involvement, and commitment. Whenever one tries to "shortcut" any one of these essential prerequisites, the results are soon diminished. The literature indicates that when effective schools processes were followed appropriately, it never failed to produce school improvement. On the other hand, in many situations where effective schools processes were not implemented properly, it did not produce more effective schools for more students.

The early efforts to implement programs of school improvement based on the effective schools research clearly supported the individual school as the strategic unit for change. Effective schools research emphasizes that if school improvement is going to occur, it will occur school-by-school and one school at a time.

Experience with the school-by-school model has taught researchers a number of valuable lessons which, taken together, serve to reinforce the district-wide concept associated with this phase of the effective schools movement. Two forces seem to have combined to reinforce the current emphasis on the overall district planning model. First, political necessity associated with the general educational reform movement of the 1980's meant that local school districts needed a comprehensive program of school improvement if they were going to satisfy their various constituencies. After all, it did not seem to serve the interests of the local board and superintendents if, when asked about their commitment to school improvement, they could only respond by saying that they were doing what they were told by state mandates, but some of their individual schools were engaged in an effective schools process at the building level. From this frame of reference, the effective schools model represented a viable, manageable, and, therefore, attractive district response to the call locally for a program of school improvement.

Independent of these larger political considerations, experiences with the effective schools model at the school level caused those working with it to realize that individual schools exist as a part of the larger legal, political, and organizational setting of the local school district. What became clear was that one could do school improvement at the individual school level and ignore this layered context and could experience success, but it was very hard. Furthermore, when an individual school's faculty set out on their own to plan and implement their program, they often found themselves at some risk from their colleagues, or at the least being impeded by district level policies, patterns, and practices.

These two forces were joined and a new, stronger formulation of the effective schools process resulted. This new formulation still places great emphasis on school level change, but it now emphasizes the larger organizational context and its role in supporting and enhancing the individual school's efforts. This new formulation builds upon the notion of a district plan that supports school change. In this plan, the policies, programs, and procedures generally thought to be beyond the control of a single school are aligned to support the effort. Those who believe in the collaborative approach at the school level strongly advocate that the district plan be written by a collaborative group of teachers, building and district administrators, and even community and parent representatives. This begins to model the collaborative process at the district level. Once the plan has been written, it would then go to the local board of education for approval. This act then establishes the plan as a matter of official policy and as the guiding force for school improvement in the district and each of its individual schools.

The current emphasis on the district model serves several valuable functions. First, it acknowledges that when it comes to sustained school improvement, there are no unimportant adults in the system. Second, it acknowledges the critical role of the board of education and superintendent as they provide the leadership and vision for school improvement. As a matter of fact, this phase of the effective schools process makes it clear that without sustained leadership from the superintendent, it is unlikely that we will see the effective schools movement become all that it could be. Third, this model also recognizes the need to couple more tightly and assure alignment between the school site and the district office. Fourth, it communicates to school level personnel that they are the key to school effectiveness and all others stand ready to do whatever they can to be of assistance.

Excellence in Special Education

In the past, excellence in special education has been defined by the general education effectiveness characteristics as mentioned above and by the ability of educators to adapt instruction to environmental and individual student differences (Wang, 1984; Reynolds, 1984). Therefore, it is essential when developing a technically sound model for excellence in special education that both the general education effectiveness literature as well as the unique characteristics of special education, namely the focus on individualized educational planning based on student characteristics and appropriate placements, be addressed.

However, a survey of the literature of the instructional options and screening procedures for students who experience learning deficits in school

indicates that almost all efforts have been directed toward providing services for students already identified as in need of special education. Little research has been aimed at placement decisions which are based on factors related to both excellence in general and special education (A Call for Quality - Mayor's Commission for Special Education, 1985) and which include valid measures of excellence in special education in terms of student outcomes as based on the attainment of IEP objectives within major goal areas.

The problem becomes even more critical when we consider the effect of unrealizable classification systems on placement decisions. Glass (1981) pinpoints the problem when he questioned the validity of a condition that could be identified in 47 times as many students in one school district as compared to another. How is it then that so many students are placed in special education in one area and not in another?

Alternatives to the current process, i.e., objective intervention, are essential to increase accountability for interventions by means of more precise measurements of behavioral or developmental changes within a defined framework of excellence in education.

For research purposes, this study proposed a model or framework for addressing the issue of excellence in special education. Four broad classes of variables were identified: school variables, student variables, family variables and community factors.

It was not possible to design research to address all these factors at once. However, having the model permitted us to design a two-year research program that systematically investigated key components in the model to ascertain how realistic it was and how components contributed to the desired outcome which was student achievement and appropriate behavior.

Need for Validated Outcome Measures

Since the goal of effective schools is to increase student learning, one major method of measuring excellence has traditionally been student achievement. Usually standardized tests are used to measure student achievement because of their psychometric properties and large normative samples. However, much criticism has been levied against the educational utility of standardized tests and their appropriateness for special education students.

The measurement of excellence in special education would, therefore, be enhanced by the development of a validated assessment model having high educational utility. As defined by Lezotte, 1988, educational utility would have the following criteria:

- assessment used for curriculum evaluation and clear expectations for student learning;
- assessment used to tract student performance longitudinally over time; and
- assessment instruments designed for machine scoring by local districts to provide rapid and specific feedback.

IEP's could meet all of the above criteria if objectives were: (1) operationalized in a hierarchical manner, (2) measurable in terms of attainment/achievement, and (3) recorded utilizing a computerized coding system.

Validated data of an IEP system such as this would increase its educational utility by providing information on studying progress of students with disabilities across handicapping condition, age, type of special education placement, etc. This would be most valuable for increasing the accuracy of placement decisions for children with disabilities. Moreover, it would provide a model that might be adapted by regular education programs because of the limited educational utility of most standardized testing programs. If this IEP system were adapted into the regular educational system, it would enhance the mainstreaming placement effort by giving the regular teacher comparable information on children with disabilities and those in regular classroom placements. In addition, the development and utilization of such an IEP system would enable schools throughout the country to answer important educational research questions on local and national issues in special education.

The rationale for this two-year research study was based upon a computerized IEP system which had been developed and is currently being implemented with a large data base in Suffolk County, Long Island, New York. The overall goal of this study was to determine factors related to excellence in special education programs using an IEP system as the measure of student achievement.

This two-year research effort revealed further information on the following:

1. A method for analyzing completion of IEP objectives and achievement data on over 1,000 students by age and handicapping condition.

   This type of data can be made useful for special education personnel in determining strengths and weaknesses of special education programs.

2. An understanding of the impact of placement on student achievement.

   Little information had existed on the effectiveness of specific special education placements as related to student achievement of IEP goals/objectives. Certain educational placements, which include factors such as: class size, student-teacher ratios and related services, are most cost-efficient than other types of placements, and also may impact differently on student achievement of IEP objectives. This study examined how type of placement and handicapping condition impact on educational achievement as measured by degree of attainment of IEP goals/objectives.

3. Factors that predict placement decisions.

   Student placement decisions should be based on objective criteria such as student achievement, behavior and child characteristics.

In fact, some earlier studies have found that such variables as I.Q. and parent variables such as intactness of family and familial support have been better predictors than student achievement. Perhaps this is because there are so few useful measures of achievement for special education students. This study examined predictors of student placement using an hierarchically coded I.E.P. system as the measure of achievement. Discriminant analyses were used to distinguish those youngsters in different types of special education placements.

4. A research model for understanding excellence in special education settings.

   This study was also used to determine which factors contribute significantly or predict excellence using student achievement as a criterion for excellence.

There had been very limited focus on the achievement of excellence in special education programs. Also, research had not determined predictors of educational excellence using completion of IEP objectives as a criteria. The predictors used in this study of educational excellence were based on the review of the literature described earlier. They included school, student, and community variables. Regression analysis was used to determine the extent to which the attainment of specific levels of achievement was associated with specific sets of predictor variables.

RESEARCH QUESTION 4

Do youngsters with similar characteristics and disabilities who are placed in different special education settings differ in level of achievement?

METHOD

The relationship between three different types of placement in special education settings and student achievement was examined for students with different handicapping conditions within different age groups.

The independent variable, type of placement, consisted of three types of size options as follows:

* The Special Class Program - Size Option 1 is defined as the ratio of 1 teacher to 12 students. This program is designed for pupils whose special education needs require specialized instruction which can best be accomplished in a self-contained setting for at least 50% of the school day with other students having similar special educational needs.

* The Special Class Program - Size Option 2 is defined as the ratio of 1 teacher + 1 paraprofessional to 12 students. In addition to the need for special education instruction, students in this program exhibit management needs which interfere with the instructional process to the extent that an additional adult is needed within the classroom to assist with the management needs of the pupils.

* The Special Class Program - Size Option 3 is defined as the ratio of 1 teacher + 1 paraprofessional to 6 students. This program provides very individualized instruction. It offers the structure and the adult to student ratio necessary for the students whose management needs are determined to be highly intensive.

The dependent variable student achievement was measured by (1) percentage of IEP objectives completed in reading, mathematics and behavioral areas and (2) standardized achievement test scores on the Stanford Diagnostic Test in reading and mathematics and the behavioral quotient of the Behavioral Evaluation Scale.

Description of Instruments

The Stanford Diagnostic Reading Test (Karlsen, Madden & Gardner, 1976 and 1977) and the Stanford Diagnostic Mathematics Test (Beatty, Madden, Gardner & Karlsen, 1976) measure the major components of the reading and mathematics process respectively. Four levels of each test with two parallel forms can be used to diagnose students' strengths and weaknesses in reading or mathematics from the end of the first grade through junior college. The tests appear to be reliable and valid instruments based on measures of internal consistency, reliability, alternate form reliability and criterion-related validity.

The Behavioral Evaluation Scale (McCarney, Leigh and Cornbleet, 1983), is designed for use as a general behavioral assessment scale for any referred student and as a specific diagnostic instrument for students suspected of having behavior disorders/emotional disturbance. The test consists of five subscales and two types of normative data may be obtained from the BES, subscale standard scores and a standard quotient for the total scale. Measures of internal and test-retest reliability appear more than adequate, as do measures of the validity of the instrument (content validity, criterion-related validity and construct validity measures).

Sample

The student sample pool included children with one of four primary handicapping conditions enrolled in the Suffolk #2 BOCES special education schools in 1986. Table 1 presents the breakdown of elementary and secondary students classified as emotionally handicapped (EH), learning disabled (LD), trainable mentally retarded and educable mentally retarded (TMR & EMR).

Table 1

Sample from Suffolk BOCES 2 by Grade Level and Handicapping Condition.

	Elementary	Secondary	Total
EH	110	347	457
LD	149	139	288
TMR	35	97	132
EMR	39	91	130
Total	333	674	1,007

From the above sample pool, students with IQ, standardized achievement and behavioral quotient scores and IEP objectives were those remaining in the sample.

Based on the above selection criteria, the numbers of students within the three different types of placement options were insufficient for using matched pairs of youngsters for the proposed research design. Therefore, it was planned to use IQ as a covariate to control for significant differences between the placement groups.

Data Analysis: One-Way ANOVA and ANCOVA

One-way ANOVAS using IQ as the dependent variable and type of placement as the independent variable were run for each of the four age groups: (5-7 years, 8-11 years, 12-15 years and 16+ years) within handicapping condition (TMR, EMR, LD & EH). If IQ was found to be significant among the three placement groups then an ANCOVA was performed using IQ as the covariate in Phase II.

Phase II

Based on the above analysis, separate one-way ANOVAS or ANCOVAS, with IQ as the covariate, type of placement as the independent variable and student

achievement as the dependent variable, were conducted for each age group (5-7 years, 8-11 years, 12-15 years and 16+ years) within handicapping condition.

RESULTS

Tables 2 to 5 present the mean scores for the three placement groups for each type of handicap and age group. The means of each placement group for IQ, standardized tests for reading, math and behavior, and percentage of IEP objectives completed for reading, math and behavioral areas are given and significant differences are indicated.

Emotionally Handicapped Students

Table 2 presents the mean scores for the three placement option groups for emotionally handicapped students for four different age groups. There were no significant IQ differences between any of the placement option groups for any age group. Therefore, no ANCOVAS were performed since there was no need to control for IQ differences.

5 to 7 year old EH students: There was no data on students, ages 5 to 7 in Option Group 1. There were also insufficient numbers of scores on the reading and math standardized tests for Option Groups 2 and 3, so no one-way ANOVAS were performed for the achievement test variables.

There was a significant difference at the .05 level on the percent of IEP behavioral objectives completed for the 5 to 7 year old EH students. No significant differences were found between any of the option groups for the percentage of reading or math IEP objectives completed for the 5 to 7 year old EH students.

8 to 11 year old EH students: There were no significant differences between any of the three placement groups on the standardized tests of reading, math or behavior for the 8 to 11 year old EH students. There was a significant difference at the .01 level between Option Group 2 and Option Group 1 on the percent of reading IEP objectives completed for 8 to 11 year old EH students. There was a significant difference at the .01 level on the percent of behavioral IEP objectives completed for this age group, with Option Group 3 higher than Option Groups 1 and 2.

12 to 15 and 16+ year old EH students: There was a significant difference at the .05 level on the standardized behavioral quotient with Placement Option Group 1 and 2 higher than Option Group 3 for the 12 to 15 year old EH students. There was a significant difference at the .01 level between Option Group 1 and Option Group 3 and between Option Group 2 and Option Group 3 on the percent of reading IEP objectives completed for this age group. No variables achieved significance for the 16 and older EH students.

Learning Disabled Students

Table 3 presents the mean differences between the three placement options for learning disabled students for four different age groups.

5 to 7 year old LD students: There was no data available on students, ages 5 to 7 in Option Group 1 and analyses were not performed for reading and math standardized tests due to lack of data. There was a significant difference on the standardized test of behavior (behavioral quotient scores) between Option Group 2 and Option Group 3 at the .04 level for 5 to 7 year old LD students.

There was also a significant difference between the means of Option Groups 2 and 3 at the .04 level for the percentage of IEP math objectives achieved by the 5 to 7 year old LD students. No other variables had significant differences for this age group.

8 to 11 year old LD students: The IQ scores for 8 to 11 year old LD students indicated that there was a significant difference in IQ at the .03 level among the three option groups for those students in the subsample for IEP reading objectives. Therefore, ANCOVAS were performed for this group, with IQ as the covariate to control for this difference.

When the ANCOVA was performed and IQ means adjusted, there were significant differences between the placement groups for the percentage of IEP reading objectives completed for the 8 to 11 year old LD students. There were significant differences between the means of Option Group 1 and 3 at the .01 level for the percentage of reading objectives achieved. There were no significant differences for the percentage of math or behavioral objectives completed. Due to insufficient numbers or scores, it was not possible to analyze the reading and math standardized test data for this age group.

12 to 15 and 16+ year old LD students: There were significant mean differences between Option Groups 1 and 3 and between Option Groups 1 and 2 on the standardized reading tests for the 12 to 15 year old LD students. For the 16 and older LD group, there were significant mean differences on completion of IEP behavioral goals between Option Groups 1 and 2. No other group means had significant differences on any of the other variables for either the 12 to 15 year old or for the 16 and older LD students.

Educable Mentally Retarded Students

Table 4 presents the mean differences among the three placement options for educable mentally retarded students. Analyses were not performed for the 5 to 7 year old group or for the 16 and older placement Option 3 EMR group due to a lack of data on standardized tests and percentages of IEP objectives achieved. ANOVAS were performed on the 8 to 11 year old, the 12 to 15 year old, and the 16 and older placement Option 1 and Option 2 educable mentally retarded students.

8 to 11 year old EMR students: The IQ mean scores did not differ significantly among the three groups. There were significant mean differences at the .02 level among the three option groups for the percentage of behavioral IEP objectives achieved for the 8 to 11 year old EMR students.

12 to 15 and 16+ EMR students: The IQ mean scores differed significantly for the 12 to 15 year old EMR students in the standardized math achievement test and the IEP math objectives subsamples. Therefore, ANCOVAS were performed. There were no significant differences among any of the option groups on the scores of the standardized math achievement test or on the percent of IEP math objectives completed. There was a significant mean difference at the .04 level between Option Group 1 and Option Groups 2 and 3 on the percentage of reading objectives achieved. There were no significant differences on any of the other variables for this age group.

The IQ mean scores did not differ among the three groups for any of the variables for the 16+ EMR student. Therefore, ANCOVAS were not performed. There was a significant mean difference at the .02 level between Option Group 1 and Option Group 2 for the behavioral achievement test scores for the 16+ EMR students to be significantly different for both IEP reading and math subsamples. Therefore, ANCOVAS were performed for both the percent of IEP reading and math objectives achieved. A significant mean difference was found at the .01 level between Option Group 1 and 3 and between Option Group 2 and 3 for the percent of IEP math objectives completed for the 16+ age group. No significant difference was found for percentage of reading or behavioral goals completed.

Trainable Mentally Retarded Students

Table 5 presents the mean scores for the three option groups for trainable mentally retarded students with ANOVA and ANCOVA results.

There was insufficient data for analysis of any variables for the 5 to 7 year old group and a lack of standardized test data for analysis for the other three age groups.

8 to 11 year old TMR students: The IQ mean scores for the 8 to 11 year old TMR students were found to be significantly different between Option Groups 1 and 3 and between Option Groups 2 and 3 for the IEP math and behavior goals subsamples. Therefore, an ANCOVA was performed for the percentage of IEP math and behavior objectives achieved for this age group, but no significant differences were found for the completion of IEP Objectives in any goal area.

12 to 15 year old TMR students: The IQ mean scores for the 12 to 15 year old TMR students were found to be significantly different between Option Groups 1 and 3 and between Option Groups 2 and 3. Therefore, an ANCOVA was performed for the percentage of IEP Objectives achieved for this age group: Only one significant difference was found for either the ANOVA or ANCOVA analysis for the percentage of IEP objectives completed for the 12 to 15 year olds. There was a significant mean difference between Option Groups 1 and 2 and between Option Groups 3 and 2 for the percentage of IEP behavioral objectives completed for this age group.

16+ TMR students: The IQ mean scores for the 16+ age group of TMR students were found to be significantly different among the three

option groups for the IEP reading and math subsamples, so ANCOVAS were performed. There was a significant difference (at the .01 level) among the three placement option groups for the percent of IEP math objectives achieved. There were no significant differences among the three groups for the percentage of reading or behavior objectives achieved.

SUMMARY AND CONCLUSIONS

Results indicate that there were almost no significant differences in IQ among placement option groups for the emotionally handicapped and the learning disabled. Therefore, it appears that appropriate behavioral criteria rather than IQ were used to make these placement decisions.

Overall, no consistent theme emerges from the data. Youngsters of the same age and handicapping condition who were placed in different special education settings (three different placement options) did differ significantly on some achievement measures, as summarized at the end of this section.

More significant differences among the placement groups were found for the completion of IEP objectives than for scores on standardized tests. More differences were found for achievement related to behavior than for reading or mathematics.

Though the differences are statistically significant, the reader should bear in mind that they may or may not have educational significance, especially when the sample size is small. For the youngest age group (5 to 7 year olds) across all handicapping conditions and for most of the age groups for the educable and trainable mentally retarded, achievement test data is missing. These tests were deemed inappropriate as criterion measures for students with these handicapping conditions in these age groups and, therefore, they were not tested.

Also, there were no students in some placement options, or no students with data, which meant it was not possible to compare the three option groups in these cases.

A summary of significant differences is outlined below by type of handicapping condition and age group. There does not appear to be consistent behavioral or achievement differences among the three placement groups across handicapping conditions or age groups. One interpretation is that if students are properly placed, they should proceed at a similar pace and at a similar level of achievement, regardless of placement options having different staff/student ratios.

Summary of Significant Findings

Emotionally Handicapped

5 to 7	IEP Behavioral Objectives completed (Option Group 1 significantly higher than Group 2 or 3)
8 to 11	IEP Reading Objectives completed (Group 1 higher than Group 2)
8 to 11	IEP Behavioral Objectives completed (Group 3 higher than Group 1 and 2)
12 to 15	Standardized Behavioral Quotient (Group 1 and 2 higher than 3)
12 to 15	IEP Reading Objectives completed (Groups 1 and 2 significantly higher than Group 3)
12 to 15	IEP Math Objectives completed (Group 2 significantly higher than Group 1)

Learning Disabled

5 to 7	Standardized Behavioral Quotient (Option Group 2 significantly higher than Group 3)
5 to 7	IEP Math Objectives completed (Group 2 higher than 3)
8 to 11	IEP Reading Objectives completed (Group 1 significantly higher than 3)
12 to 15	Standardized Reading Tests (Group 1 is significantly higher than Groups 2 and 3)
16+	IEP Behavioral Objectives completed (Option Group 1 significantly higher than Group 2)

Educable Mentally Retarded

8 to 11	IEP Behavioral Objectives completed (Option Group 1 and 2 significantly higher than 3)
12 to 15	IEP Reading Objectives completed (Group 1 significantly higher than 2 and 3)
16+	Standardized Behavioral Quotient (Option Group 1 significantly higher than 2)

Trainable Mentally Retarded

12 to 15	IEP Behavioral Objectives completed (Option Group 1 and 3 higher than Group 2)
16+	IEP Math Objectives completed (Option Group 1 and 2 significantly higher than 3)

TABLE 2

Mean Scores For Three Placement Options For Emotionally Handicapped Students With ANOVA And ANCOVA Results

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 5-7					
IQ					
Reading Achievement	NO	DATA	AVAILABLE		
IQ	↓	↓	↓		
Math Achievement					
IQ	n=2	n=3	n=7		
Behavioral Quotient	96.50	97.33	83.14	.97	.41
	105.00	75.67	71.71	2.50	.15
IQ	n=2	n=5	n=11		
IEP Reading Goals Achieved	96.50	91.80	85.55	.77	.48
	.83	.40	.68	1.17	.33
IQ	n=1	n=2	n=2		
IEP Math Goals Achieved	109.00	96.50	81.50	.87	.53
	.75	.00	.54	5.49	.15
IQ	n=2	n=5	n=11		
IEP Behavior Goals Achieved	96.50	91.80	85.55	.77	.48
	1.00	.40	.35	.53	.05*
Age 8-11					
IQ	n=4	n=4	n=12		
Reading Achievement	86.75	98.25	93.35	.66	.53
	3.60	3.90	2.60	.65	.53
IQ	n=7	n=7	n=14		
Math Achievement	87.00	91.29	94.36	1.14	.34
	3.00	3.00	2.70	.31	.74
IQ	n=7	n=11	n=30		
Behavioral Quotient	91.29	93.46	88.27	.51	.60
	76.43	83.82	73.83	1.48	.24
IQ	n=12	n=19	n=36		
IEP Reading Goals Achieved	91.42	92.68	88.42	.65	.53
	.63	.24	.39	5.25	.01*
IQ	n=13	n=16	n=31		
IEP Math Goals Achieved	90.77	92.75	91.13	.11	.90
	.51	.42	.45	.35	.71
IQ	n=13	n=19	n=40		
IEP Behavior Goals Achieved	90.77	92.68	87.00	1.18	.32
	.02	.02	.17	4.96	.01*
Age 12-15					
IQ	n=18	n=22	n=18		
Reading Achievement	92.22	90.90	88.06	.54	.59
	5.80	4.70	5.00	.85	.43
IQ	n=16	n=15	n=21		
Math Achievement	92.44	92.27	88.19	.68	.51
	5.20	4.60	3.80	1.44	.25
IQ	n=38	n=39	n=35		
Behavioral Quotient	89.87	92.15	88.97	.80	.45
	87.18	83.46	77.43	2.94	.05*
IQ	n=20	n=23	n=20		
IEP Reading Goals Achieved	90.20	90.09	88.40	.13	.88
	.84	.85	.61	5.68	.01*
IQ	n=20	n=19	n=24		
IEP Math Goals Achieved	90.80	92.79	87.58	.92	.40
	.56	.77	.65	2.96	.05*
IQ	n=14	n=18	n=16		
IEP Behavior Goals Achieved	89.14	94.72	89.56	.72	.49
	.72	.60	.52	1.38	.26
Age 16+					
IQ	n=18	n=10	n=15		
Reading Achievement	90.21	89.97	88.02	.44	.65
	6.80	6.30	6.90	.09	.92
IQ	n=17	n=12	n=19		
Math Achievement	90.00	89.91	88.00	.41	.62
	5.20	5.00	5.80	.49	.62
IQ	n=33	n=12	n=17		
Behavioral Quotient	89.88	87.16	88.76	.14	.87
	91.15	82.42	86.41	1.85	.31
IQ	n=65	n=23	n=37		
IEP Reading Goals Achieved	90.49	90.21	87.70	.55	.58
	.20	.37	.32	1.28	.28
IQ	n=59	n=20	n=39		
IEP Math Goals Achieved	90.71	89.70	87.68	.64	.53
	.25	.41	.40	1.90	.15
IQ	n=63	n=22	n=38		
IEP Behavior Goals Achieved	90.71	90.45	88.44	.37	.69
	.23	.24	.25	.07	.93

*Significant p<.05

m when IQ means were significantly different, ANCOVA with adjusted means are recorded

TABLE 3

Mean Scores For Three Placement Options For Learning Disabled Students With ANOVA And ANCOVA Results

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 5-7					
IQ		NO DATA			
Reading Achievement					
		AVAILABLE			
IQ					
Math Achievement					
IQ		n=11	n=31		
Behavioral Quotient		81.09	81.29	.00	.96
		89.20	79.78	4.59	.04*
IQ		n=16	n=42		
IEP Reading Goals Achieved		81.00	81.09	.00	.95
		.46	.51	.40	.53
IQ		n=16	n=42		
IEP Math Goals Achieved		81.00	81.09	.00	.95
		.75	.57	4.32	.04*
IQ		n=16	n=42		
IEP Behavior Goals Achieved		81.00	81.09	.00	.95
		.29	.26	.08	.78
Age 8-11					
IQ					
Reading Achievement		NO DATA			
		AVAILABLE			
IQ					
Math Achievement					
IQ	n=10	n=18	n=40		
Behavioral Quotient	80.00	83.86	76.85	1.56	.22
	97.70	95.21	87.58	2.29	.11
IQ	n=11	n=22	n=45		
IEP Reading Goals Achieved	83.82	86.68	76.84	4.11	.02*
	.70	.66	.38	13.52	.00↑
IQ	n=11	n=20	n=45		
IEP Math Goals Achieved	83.82	87.45	76.84	5.49	.00*
	.59	.62	.56	.77	.47↑
IQ	n=7	n=11	n=23		
IEP Behavior Goals Achieved	77.71	85.18	77.61	1.10	.34
	.77	.63	.60	.81	.45

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 12-15					
IQ	n=12	n=14	n=8		
Reading Achievement	84.92	82.14	83.00	.17	.85
	4.00	2.80	2.40	3.91	.03*
IQ	n=9	n=12	n=7		
Math Achievement	86.22	83.83	82.86	.15	.86
	4.00	3.30	3.10	1.04	.37
IQ	n=25	n=20	n=11		
Behavioral Quotient	85.64	81.20	81.91	.90	.41
	95.04	85.05	86.55	2.13	.13
IQ	n=14	n=17	n=9		
IEP Reading Goals Achieved	83.85	82.29	82.67	.07	.93
	.80	.68	.74	.86	.43
IQ	n=12	n=14	n=8		
IEP Math Goals Achieved	84.17	84.57	83.00	.04	.96
	.76	.67	.78	.49	.62
IQ	n=11	n=9	n=8		
IEP Behavior Goals Achieved	85.64	81.56	82.00	.28	.76
	.77	.81	.56	1.77	.19
Age 16+					
IQ	n=16	n=3	no data		
Reading Achievement	76.00	78.67	avail-	.28	.60
	5.30	4.30	able	.46	.50
IQ	n=15	n=4			
Math Achievement	76.47	78.00		.17	.68
	5.40	4.90		.37	.55
IQ	n=21	n=4	n=2		
Behavioral Quotient	75.00	77.75	79.50	.36	.70
	94.52	91.00	68.00	2.48	.11
IQ	n=18	n=4			
IEP Reading Goals Achieved	75.50	78.00	no data	.36	.56
	.89	.82		.32	.58
IQ	n=17	n=4	avail-		
IEP Math Goals Achieved	76.47	78.00		.18	.68
	.85	.63	able	2.47	.13
IQ	n=17	n=4			
IEP Behavior Goals Achieved	76.76	76.00		.04	.96
	.87	.59		5.36	.01*

*Significant p<.05

↑ when IQ means were significantly different, ANCOVA with adjusted means are recorded

TABLE 4

Mean Scores For Three Placement Options For Educable Mentally Retarded Students With ANOVA And ANCOVA Results

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 5-7					
IQ / Reading Achievement					
IQ / Math Achievement					
IQ / Behavioral Quotient	NO	DATA	AVAILABLE		
IQ / IEP Reading Goals Achieved					
IQ / IEP Math Goals Achieved					
IQ / IEP Behavior Goals Achieved					
Age 8-11					
IQ / Reading Achievement	NO	DATA	AVAILABLE		
IQ / Math Achievement					
IQ	n=7	n=13	n=4		
Behavioral Quotient	60.00	53.69	48.00	2.36	.12
	97.71	90.54	106.00	.44	.65
IQ / IEP Reading Goals Achieved	NO	DATA	AVAILABLE		
IQ	n=2		n=1		
IEP Math Goals Achieved	67.00	NA	48.00	1.49	.44
	.25	NA	.11	.01	.95
IQ	n=9	n=11	n=1		
IEP Behavior Goals Achieved	59.33	52.72	98.00	2.64	.10
	.94	.81	.20	4.64	.02*

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 12-15					
IQ / Reading Achievement	NO	DATA	AVAILABLE		
IQ	n=5		n=1		
Math Achievement	70.40	NA	47.00	8.89	.04*
	4.10	NA	2.60	2.52	.21^
IQ	n=15	n-14	n=2		
Behavioral Quotient	58.00	50.74	48.50	2.79	.08
	93.60	85.84	68.00	3.00	.06
IQ	n=17	n=20	n=2		
IEP Reading Goals Achieved	60.50	53.30	48.50	3.04	.06
	.56	.24	.23	3.47	.04*
IQ	n=7	n=6	n=2		
IEP Math Goals Achieved	67.48	57.00	48.50	6.61	.01*
	.14	.28	.37	.27	.76^
IQ	n=5	n=9	No Data		
IEP Behavior Goals Achieved	63.80	54.56	Avail-	1.51	.26
	.83	.72	able	1.04	.38
Age 16+					
IQ / Reading Achievement	NO	DATA	AVAILABLE		
IQ	n=4	n=1			
Math Achievement	68.00	69.00		.09	.78
	2.20	3.70		5.19	.10
IQ	n=14	n=3			
Behavioral Quotient	62.14	63.33		.05	.83
	91.14	67.00		1.46	.02*
IQ	n=30	n=5			
IEP Reading Goals Achieved	61.53	58.40		.25	.62
	.39	.34		.06	.80
IQ	n=31	n=5			
IEP Math Goals Achieved	60.71	58.40		.25	.62
	.38	.20		.70	.41
IQ	n=31	n=5			
IEP Behavior Goals Achieved	60.71	58.40		.52	.48
	.39	.20		.77	.39

NO DATA AVAILABLE

*Significant p<.05

^when IQ means were significantly different, ANCOVA with adjusted means are recorded

TABLE 5

Mean Scores For Three Placement Options For Trainable Mentally Retarded Students With ANOVA And ANCOVA Results

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 5-7					
IQ					
Reading Achievement					
IQ					
Math Achievement	NO	DATA	AVAILABLE		
IQ					
Behavioral Quotient					
IQ					
IEP Reading Goals Achieved					
IQ					
IEP Math Goals Achieved					
IQ					
IEP Behavior Goals Achieved					
Age 8-11					
IQ					
Reading Achievement	NO	DATA	AVAILABLE		
IQ					
Math Achievement					
IQ					
Behavioral Quotient					
IQ	n=10	n=9	n=1		
IEP Reading Goals Achieved	41.20	42.67	25.00	1.89	.18
	.47	.44	.50	.04	.96
IQ	n=10	n=9	n=2		
IEP Math Goals Achieved	41.70	42.67	24.50	4.02	.04*
	.16	.34	.01	.87	.44π
IQ	n=4	n=1	n=2		
IEP Behavior Goals Achieved	42.25	37.00	24.50	8.14	.04*
	.42	.02	.41	2.51	.23π

Variables Within Age Group	Option 1 1:12	Option 2 1:1:12	Option 3 1:1:6	f	p
Age 12-15					
IQ					
Reading Achievement					
	NO	DATA	AVAILABLE		
IQ					
Math Achievement					
IQ					
Behavioral Quotient					
IQ	n=11	n=3	n=6		
IEP Reading Goals Achieved	40.91	39.00	15.83	30.28	.00*
	.08	.33	.65	1.29	.30π
IQ	n=5	n=4	n=4		
IEP Math Goals Achieved	44.20	39.75	18.00	18.89	.00*
	.48	.20	- .25	.31	.74π
IQ	n=3	n=9	n=6		
IEP Behavior Goals Achieved	42.67	38.56	15.83	39.49	.00*
	.96	.00	.43	13.84	.00*π
Age 16+					
IQ					
Reading Achievement					
IQ	NO	DATA	AVAILABLE		
Math Achievement					
IQ					
Behavioral Quotient					
IQ	n=28	n=8	n=4		
IEP Reading Goals Achieved	35.32	32.25	17.75	4.32	.02*
	.37	.37	.14	.77	.47π
IQ	n=5	n=3	n=4		
IEP Math Goals Achieved	24.80	39.67	17.75	5.67	.03*
	.77	.48	- .18	10.18	.01*π
IQ	n=5	n=3	n=4		
IEP Behavior Goals Achieved	24.80	25.00	22.00	1.89	.12
	.25	.29	.31	.09	.77

*Significant $p<.05$

π when IQ means were significantly different, ANCOVA with adjusted means are recorded

RESEARCH QUESTION 5

What factors (such as school, family, student and achievement variables) contribute to or discriminate type of placement in special education settings?

METHOD

Type of placement was used as the criterion variable as explained above in Research Question 4.

Discriminate analysis was used to predict the dependent or criterion variable, placement in specific special education settings (options), on the basis of student, parent and school-related variables, including the attainment of IEP objectives. The specific set of predictor variables which were selected from the extant data base follow:

- age, gender, IQ, handicapping condition, the percentages of reading, mathematics and behavioral IEP objectives completed, sending district budget, and number of related services utilized.

The specific set of predictor variables which were selected from the expanded data base follow:

- school climate, teacher effectiveness, administrative leadership and parent involvement.

The Survey of Professional Staff Perceptions of School Programs

The school climate, teacher effectiveness, and administrative leadership variables were derived from The Survey of Professional Staff Perceptions of School Programs (New York State Education Department, 1987) which is a component of the Comprehensive School Improvement Planning Process search on the characteristics of effective schools, effective instruction and the change process. The survey is divided into subtests for the purposes of measuring positive and effective school atmosphere.

The first subtest is a measure of positive school climate and expectations of achievement of students. When the staff have positive attitudes towards students' ability to achieve, it is expected that students will achieve better. A high score on the subtest would indicate that children are in a safe, effective learning environment.

The second subtest is a measure of Teacher/Administrator effectiveness. When staff is supervised by observation, feedback, recommendations and follow-up training, they perform more effectively. Effective teachers enable students to reach their goals.

The third subtest is Administrative Leadership. A high score on this subtest identifies schools that have safe and positive learning environments, supports effective teaching and interacts with both teachers and students to provide a good learning environment.

Developers of the survey report adequate reliability for each subtest: coefficient alphas exceed .90 in all cases for both elementary and secondary schools. As a measure of concurrent validity, school-wide averages for each subtest were correlated with a measure of student achievement (percent of students in the school scoring above a statewide reference point on a standardized reading or English test). Positive and significant correlations were found for all three subtests when elementary and secondary school data were combined. When elementary and secondary schools were examined separately, positive and significant correlations of student achievement with the school climate and teacher effectiveness subtests, but not the administrative leadership subtest, were also obtained. The intercorrelations of the three subtests with one another were high and positive.

Survey Process

Each teacher in each facility anonymously completed the Survey of Professional Staff Perceptions. They also provided the following background information:

- Facility name
- Class size option taught during the current year
- Class size option taught during the previous year
- Their position title
- Years of employment in the facility
- Level of education
- Years of teaching experience.

The surveys were scored as follows: each item was rated on a five-point scale ranging from '5' = always to '1' = never. The items were totaled within each subtest for each teacher. An average score for each subtest was computed across teachers grouped by facility and class size option within facility. These average scores were then assigned to each student within that facility and class size option for the discriminant analysis.

Parent Involvement

In order to get a parent involvement rating for each child, each teacher was asked to rate the level of parent involvement for each child. Levels were rated using a five point scale from 1 being the lowest to 5 being the highest level of parental involvement.

Sample

The sample used for Research Question 5 is the same as the sample described above for Research Question 4.

Discriminant Analysis

Since the main purpose of Research Question 5 was to determine those potential discriminating variables that best distinguished among educational placement groups, discriminant analysis was computed. The mathematical objective of discriminant analysis is to weigh and linerarly combine the discriminating variables in some fashion so that the groups are forced to be as statistically distinct as possible. Discriminant analysis attempts to do this by forming one or more linear combinations of the discriminating variables. The maximum number of functions which can be derived is either one less than the number of groups or equal to the number of discriminating variables, if there are more groups than variables. In addition, if there are more discriminating variables than necessary to achieve satisfactory discrimination, the stepwise discriminant analysis procedure can be utilized.

The stepwise procedure was employed in this study. The process commenced by choosing the single variable which had the highest value on the selection criterion. The criterion utilized in this analysis was the overall multivariate F ratio for the test of differences among the group centroids. The variable which maximized this F ratio also minimized Wilks' lambda, a measure of group discrimination. This test took into consideration the differences between all the centroids and the cohesion (homogeneity) within the groups.

The initial variable was then paired with each of the other variables, one at a time, and the selection criterion was computed. This procedure of locating the next variable yielding the best criterion score, given the variables already selected, continued until no additional variables provided a minimum level of improvement.

For the following discriminant analyses, 13 discriminating variables were used as articulated above.

It should be noted that cases with missing values were deleted in a listwise fashion in the computation of the stepwise discriminant analyses. That is, listwise deletion caused a case to be omitted from the calculation when that case contained a missing value on any variable entered into the computation. For the calculation of the classification routine, all cases were included as follows. If the placement group code was missing, the case was treated as unclassified. If data were missing from the discriminating variable, the total mean for the respective variable was submitted. Therefore, at times, the number of cases used in the stepwise discriminant analyses were different from the number of cases used in the classification routines.

For the stepwise discriminant analysis performed on the entire sample, three educational placement groups (Options) were used as explained above. For the succeeding stepwise discriminant analyses performed on the four separate handicapped subsamples (TMR, EMR, LD, EH), the three placement groups (Options) were also used.

RESULTS

Stepwise Discriminant Analyses with Three Placement Groups with the Entire Sample

Results of the stepwise discriminant analysis (using 14 discriminating variables and three educational placement groups) with the entire sample are presented in Tables 6 and 7.

Table 6 shows the group means and standard deviations for each of the potential discriminating variables by each of the three placement groups (option 1, 2 and 3) with the entire sample.

TABLE 6

Group Means and Standard Deviations for
Each Discriminating Variable for
Each of the Three Placement Groups with the Entire Sample

Variable	Size Option 1 (N=84)		Size Option 2 (N=67)		Size Option 3 (N=121)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	14.54	3.08	12.24	3.48	10.89	3.32
Gender	1.26	.44	1.19	.40	1.21	.41
IQ	82.11	16.21	78.77	18.91	83.36	14.10
Handicap	1.64	.79	1.87	.74	7.56	.53
Parent Involvement	2.05	.93	2.39	1.15	2.31	1.09
School Climate	108.32	11.15	94.31	7.10	90.60	13.63
Teacher Effectiveness	65.90	7.99	60.10	5.16	57.33	10.64
Administrative Leadership	50.64	6.34	45.24	6.27	41.14	7.39
District Economic Level	727.35	77.02	710.13	61.63	695.86	96.95
School	56.67	25.19	53.73	22.08	42.23	19.81
Related Services	1.10	.11	1.08	.12	1.12	.13
Percent IEP Reading Objectives Completed	.41	.44	.43	.38	.41	.31
Percent IEP Math Objectives Completed	.35	.39	.41	.28	.47	.34
Percent IEP Behavioral Objectives Completed	.32	.44	.27	.37	.30	.35

The stepwise discriminant procedure resulted in 12 variables; namely, age, gender, handicap, school climate, teacher effectiveness, administrative leadership, district economic level, school, percent IEP reading objectives completed, percent IEP math objectives completed, percent IEP behavioral

objectives completed and related services utilized, entering into the analysis at step 1 and continued through to step 12. The remaining two variables, IQ and parent involvement added very little to the discrimination among the three conditions and, therefore, was not forced into the analysis. The 12 variables were selected before the Wilks' lambda became non-significant and produced a relatively high degree of separation among the three groups as indicated by the final Wilks' lambda of .40. The standardized canonical discriminant function coefficient contributions of the 12 discriminating variables to each of the functions indicated that the first function represented primarily school climate (2.41) and teacher effectiveness (-1.66). The second function was primarily represented by school climate (-2.46) and used teacher effectiveness (1.40) and administrative leadership (1.37) as secondary components.

The first significant discriminant function ($\underline{X}^2$ = 249.08, $\underline{df}$ = 24, $\underline{p} <$ .001), with its eigenvalue (1.10) and canonical correlation (.72) connotes a noticeable degree of separation among the groups. The second function seems to be of less use in separating the groups based on its smaller eigenvalue (.22) and its low canonical correlation (.43). Moreover, before any function was removed, lambda was .40, indicating that a relatively strong amount of discriminating power existed in the variables being used. After some of this discriminating power was removed by placing it into the first discriminant function, lambda increased to .83, and even though the chi-square was still significant, the second function rendered a slightly smaller amount of discriminating information.

Further evidence about group differences can be derived from the group centroids. Using the first function for the two measures, the centroids for the three placement categories, were as follows: Option 1 = 1.19; Option 2 = -.83, and Option 3 = .37. For comparative purposes, the centroids on the second function were: Option 1 = .99; Option 2 = .32; and Option 3 = -.83. It appears that a separation among the groups were similarly pronounced by each function but in a different manner. The centroids for placement on the first function indicated that Option 1 was separated considerably from Option 2 and Option 3 while in function two, the centroids appeared more equally spaced with Option 2 occupying the intermediate position. The centroids indicated a more distinct separation for Options one and three.

Table 7 presents the classification routine which classifies the original set of cases to see how many were correctly classified by the variables used. Approximately 65% of the cases were correctly identified by the classification routine as members of the group to which they actually belonged, with all the errors made in misclassifying those youngsters in Option 2, regardless of placement with those placed in Option 1.

TABLE 7

Classification for the Three Placement Groups
with the Entire Sample

Actual Group	N of Cases	Predicted Group Membership Option 1	Option 2	Option 3
Option 1 (1:12)	393	60.8%	36.6%	2.5%
Option 2 (1:1:12)	309	17.5%	62.1%	20.4%
Option 3 (1:1:6)	309	2.6%	24.3%	73.1%

Percent of "Grouped" Cases Correctly Classified: 65.18%

Stepwise Discriminant Analysis with Three Placement Groups with the Emotionally Handicapped Subsample

Results of the stepwise discriminant analysis (using 13 potential discriminating variables and three educational placement groups) for the emotionally handicapped subsample are presented in Tables 8 and 9.

Table 8 (see following page) shows the group means and standard deviations for each of the 12 potential discriminating variables by each of the three placement groups (Option 1 = 1:12, Option 2 = 1:1:12, Option 3 = 1:1:6) with the emotionally handicapped subsample.

The stepwise discriminant analysis procedure resulted in eight variables; namely, school climate, teacher effectiveness, administrative leadership, age, school, percent IEP reading and math objectives completed and district economic level, entering into the analysis. After the eighth step, the remaining five variables added very little to the discrimination between the two groups and, therefore, was not forced into the analysis. The Wilks' lambda became non-significant after the eighth variable and, therefore, no other variables were selected. These variables gave a relatively high degree of separation as indicated by Wilks' lambda of .19. The standardized canonical discriminant function coefficient representing the relative contribution of these variables to the function indicated that school climate (3.68) and teacher effectiveness (-2.67) contributed most to the first function, whereas school climate (-3.34), teacher effectiveness (2.37) and administrative leadership contributed highly to the second function.

The high eigenvalue (2.75) and its associated canonical correlation (.85) for the first significant discriminant function ($\chi^2 = 196.33$; $df = 16$, $p < .001$) gave further evidence of a higher degree of separation between the groups. The relatively lower eigenvalue (.42) and its associated canonical correlation (.54) for the second significant discriminant function ($\chi^2 = 40.93$, $df = 7$, $p < .001$) connoted a lower degree of separation between the groups for the second function than the first. Furthermore, the percent of variance or discriminatory power had a slightly higher contribution for the first function (56.02%) than the second function (44.98).

TABLE 8

Group Means and Standard Deviations for
Each Discriminating Variable for
Each of the Three Placement Groups with Emotionally Handicapped Subsample

Variable	Size Option 1 (N=46)		Size Option 2 (N=23)		Size Option 3 (N=55)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	14.19	2.92	14.00	2.66	12.76	2.94
Gender	1.20	.40	1.22	.42	1.13	.33
IQ	90.48	12.92	90.08	13.43	89.44	12.84
Parent Involvement	1.96	.82	2.04	1.11	2.16	.98
Related Services	1.11	.10	1.10	.10	1.09	.10
School Climate	110.15	10.76	98.65	3.69	81.36	14.87
Teacher Effectiveness	65.89	8.97	60.78	5.64	49.45	11.04
Administrative Leadership	51.56	7.32	50.26	4.51	37.20	9.03
District Economic Level	728.33	66.27	702.65	80.62	695.76	89.64
School	53.70	28.39	52.17	31.18	32.36	18.46
Percent IEP Reading Objectives Completed	.44	.45	.49	4.20	.36	.34
Percent IEP Math Objectives Completed	.34	.40	.40	.37	.24	.35
Percent IEP Behavioral Objectives Completed	.26	.41	.24	.35	.23	.28

The group centroids gave further evidence about the group differences. Using the first function for the two measures, the centroids for the three placement categories were as follows: Option 1 = -1.64; Option 2 = .90; and Option 3 = 1.03. In comparison, the centroids for the second function were: Option 1 = 1.10; Option 2 = .96; and Option 3 = -1.31. It appeared that the separation among the groups was just as pronounced on the first function as on the second. In addition, the centroids for the three placement groups were equally spaced with the Option 2 group occupying the intermediate position on both discriminant variates.

Table 9 (see following page) presents the classification routine which classified the original set of cases to see how many were correctly classified by the variables used. Approximately 83% of the cases were correctly identified by the classification routine as members of the group to which they actually belonged, with most of the errors in misclassifying those youngsters in Option 1 with those in Option 2; there were some errors in misclassifying those youngsters in Option 2 with those in Option 1.

TABLE 9

Classification Results for the Three Placement Groups
With the Emotionally Handicapped Subsample

Actual Group	N of Cases	Predicated Group Membership Option 1	Option 2	Option 3
Option 1 (1:12)	159	84.0%	13.2%	2.5%
Option 2 (1:1:12)	128	23.4%	71.9%	4.7%
Option 3 (1:1:6)	172	1.7%	8.7%	89.5%

Percent of "Grouped" Cases Correctly Classified: 83.44%

Stepwise Discriminant Analysis with Three Placement Groups with the Learning Disabled Subsample

Results of the stepwise discriminant analysis (using 13 discriminating variables and three educational placement groups) for the learning disabled subsample are presented in Tables 10 and 11.

Table 10 (see following page) shows the group means and standard deviations for each of the 13 discriminating variables by each of the three educational placement groups (Option 1 = 1:12, Option 2 = 1:1:12, and Option 3 = 1:1:6) for the learning disabled subsample.

The stepwise discriminant analysis procedure resulted in ten variables; namely, school climate, age, school, administrative leadership, teacher effectiveness, related services utilized, percent IEP behavioral and reading objectives completed, district economic level and gender, entering into the stepwise discriminant analysis. After the tenth step, the three remaining variables added very little to the discrimination between the three groups and, therefore, did not enter into the analysis. The ten variables were selected before the Wilks' lambda became non-significant. The ten variables produced a noticeable degree of separation between the groups as indicated by the Wilks' lambda of .33 on the first function.

The standardized canonical discriminant function coefficient representing the relative contribution of these variables to the function was 1.69 for school climate, and .90 for administrative leadership and .60 for age. There was a lower degree of separation between the groups for the second function as indicated by a Wilks' lambda of .73. The standardized canonical discriminant function coefficient indicated that most of its importance can be attributed to the variables age (.68) and teacher effectiveness (.60).

TABLE 10

Group Means and Standard Deviations for
Each Discriminating Variable for
Each of the Three Placement Groups with the Learning Disabled Subsample

Variable	Size Option 1 (N=22)		Size Option 2 (N=30)		Size Option 3 (N=64)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	14.41	3.70	9.97	3.32	9.27	2.81
Gender	1.23	.43	1.10	.30	1.28	.45
IQ	80.59	9.53	82.16	14.12	19.20	12.24
Parent Involvement	1.95	.95	2.60	1.32	2.42	1.18
Related Service	1.06	.13	1.06	.13	1.13	.15
School Climate	110.68	12.23	90.33	6.27	98.30	5.24
Teacher Effectiveness	68.23	7.15	59.07	3.81	63.95	3.38
Administrative Leadership	50.36	5.07	41.20	5.04	44.39	3.05
District Economic Level	726.09	71.62	717.90	37.40	696.89	104.78
School	62.73	23.95	53.33	17.68	50.63	17.26
Percent IEP Reading Objectives Completed	.48	.44	.58	.29	.47	.28
Percent IEP Math Objectives Completed	.53	.47	.53	.34	.51	.32
Percent IEP Behavioral Objectives Completed	.48	.48	.35	.40	.35	.39

The eigenvalue (1.23) and its associated canonical correlation (.73) for the first significant discriminant function (X^2 = 121.28; df = 18, p = .001) indicated a noticeable degree of separation among the groups. The second function did not appear to be as useful in discriminating among the groups as evidenced by its smaller eigenvalue (.36) and its lowered canonical correlation (.52). Before the function was removed, lambda was .35, indicating a high degree of discriminating power existent in the variables being used. After some of this discriminatory power was removed by placing the variables in the first discriminant function, lambda increased to .76 and the chi-square was significant but lower (X^2 = 33.80; df = 8, p = .001). Furthermore, the percent of variance in the first function was (78%) considerably higher than the second function (22%).

The group centroids give further evidence about group differences. The centroids for the three placement categories are as follows: Option 1 = 2.16; Option 2 = -1.02; and Option 3 = .26. The centroids for the second function are: Option 1 = .48; Option 2 = .78; and Option 3 = .53. It appears that the separation among the groups was more pronounced on the first discriminant than on the second. In addition, on the first discriminant variate, the centroids for the three placement conditions were about equally spaced, with Option 3 occupying the intermediate position. On the second discriminant, the centroids for the three placement conditions were not separated distinctly.

Table 11 presents the classification routine which classified the original set of cases to see how many were correctly classified by the variables used. Approximately 75% of the cases were correctly classified by the classification routine as members of the group to which they actually belonged, with approximately 17% of the youngsters in Option 1 misclassified to Option 2. Approximately 18% of the youngsters in Option 2 were misclassified into Option 3 and approximately 17% of the youngsters in Option 3 were misclassified into Option 2.

TABLE 11

Classification Results for Three Placement Groups for the Learning Disabled Subsample

		Predicted Group Membership		
Actual Group	N of Cases	Option 1	Option 2	Option 3
Option 1 (1:12)	98	66.3%	17.3%	16.3%
Option 2 (1:1:12)	84	3.6%	75.0%	21.4%
Option 3 (1:1:6)	107	1.9%	13.1%	85.0%

Percent of "Grouped" Cases Correctly Classified: 75.78%

Stepwise Discriminant Analysis with Three Placement Groups with Educable Mentally Retarded Subsample

Table 12 (see following page) shows the group means and standard deviations for each of the 13 discriminating variables for each of the three placement options (Option 1 + 1:12, Option 2 = 1:1:12, Option 3 = 1:1:6) with the educable mentally retarded subsample.

The stepwise discriminant analysis procedure resulted in six variables; namely, age, related services, administrative leadership, district economic level, IQ and percent IEP reading objectives completed which qualified in the analysis and predicted a significant separation between the placement groups with the educable mentally retarded subsample. After the sixth step, the remaining six variables added very little to the discrimination between the three groups and, therefore, were not entered. These six variables produced a relatively moderate degree of separation between the groups as indicated by the Wilks' lambda of .45. The standardized canonical discriminant function coefficient representing the contribution of these variables to the function were IQ (.59); age (.57); administrative leadership (.50) and district economic level (.49).

The eigenvalue (.74) and its associated canonical correlation (.65) for the one significant discriminant function (X^2 = 21, df = 12, p = .05) further connoted a relatively moderate degree of separation between the groups. The second function appeared to offer little information based on its low eigenvalue (.27) and low canonical correlation (.46). After some of the discriminating power was removed by placing the variables into the first discriminant function,

TABLE 12

Group Means and Standard Deviations for
Each Discriminating Variable for
Each of the Three Placement Groups with Educable Mentally Retarded Subsample

Variable	Size Option 1 (N=16)		Size Option 2 (N=14)		Size Option 3 (N=2)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	15.69	2.41	14.21	1.80	11.50	.71
Gender	1.50	.52	1.35	.49	1.00	.00
IQ	60.12	9.60	52.93	9.62	49.00	1.41
Parent Involvement	2.43	1.15	2.50	1.22	3.00	.00
Related Services	1.09	.10	1.09	.13	1.30	.14
School Climate	99.81	6.00	95.71	8.55	98.50	3.53
Teacher Effectiveness	62.75	4.63	61.21	6.68	62.00	2.83
Administrative Leadership	48.37	5.16	45.64	5.08	45.50	.71
District Economic Level	726.25	111.64	705.79	70.05	665.50	19.09
School	56.88	14.48	57.14	10.69	45.00	7.07
Percent IEP Reading Objectives Completed	.23	.36	.25	.38	.06	.19
Percent IEP Math Objectives Completed	.15	.27	.19	.39	.18	.10
Percent IEP Behavioral Objectives Completed	.25	.45	.16	.34	.30	.14

lambda increased to .79 and the chi-square denoted that a nonstatistically significant amount of discriminating information now existed.

Group centroids indicated that there was little separation among groups on the first discriminant variate. The centroids for the three placement categories on the first function were as follows: Option 1 = .73; Option 2 = -.70; and Option 3 = -.91. In comparison, the centroids for the second discriminant variate were: Option 1 = .23; Option 2 = .07; and Option 3 = 2.37. When a scatterplot was graphed, the results indicated that there was no visibly distinct separations among the groups.

Table 13 presents the classification routine which classifies the original set of cases to see how many are correctly classified by the variables used. Approximately 41% of the cases were correctly identified by the classification routine as members of the groups to which they actually belonged, with most of the errors in Option 1 misclassified to Option 2 (23%), Option 2 misclassified to Option 1 (65%), and Option 3 misclassified to Option 1 (32%) and to Option 2 (55%).

TABLE 13

Classification Results for Three Placement Groups for Educable Mentally Retarded Subsample

Actual Group	N of Cases	Predicted Group Membership Option 1	Option 2	Option 3
Option 1 (1:12)	320	75.0%	23.1%	1.9%
Option 2 (1:1:12)	256	65.2%	29.7%	5.1%
Option 3 (1:1:6)	304	32.2%	51.3%	16.4%

Percent of "Grouped" Cases Correctly Classified: 41.59%

Stepwise Discriminant Analysis with Three Placement Groups with Trainable Mentally Retarded Subsample

A stepwise discriminant analysis procedure was attempted with the 12 potential discriminating variables for each of three placement groups (Option 1 = 1:12; Option 2 = 1:1:12; Option 3 = 1:1:6) with the trainable mentally retarded subsample.

When the cases were processed initially, it was found that there was an insufficient number of cases without missing data to perform the stepwise discriminant analysis. A frequency statistic indicated that the variable, Parent Involvement, had no data compiled for the trainable mentally retarded subsample. Subsequently, a stepwise discriminant analysis was performed for this subgroup using 12 variables and excluding the parent involvement variable. (See Table 14 on the following page.)

Table 14 shows group means and standard deviations for each of the 12 discriminating variables for each of the three placement options (Option 1 = 1:12, Option 2 = 1:1:12, Option 3 = 1:1:6) with the trainable mentally retarded subsample.

The stepwise discriminant analysis procedure resulted in six variables; namely, percent IEP reading. Objectives completed, IQ, gender, age, district economic level and percent IEP math objectives completed which qualified in the analysis and predicted a significant separation between the placement groups with the trainable mentally retarded subsample. After the sixth step, the remaining six variables added very little to the discrimination between the three groups and, therefore, were not entered. These six variables produced a relatively moderate degree of separation between the groups as indicated by the Wilks' lambda of .07. The standardized canonical discriminant function coefficient representing the contribution of the variables to the function were IQ (1.61), percent IEP reading objectives completed (1.46) and age (1.101).

The eigenvalue (4.31) and its associated canonical correlation (.90) for the one significant discriminant function (χ^2 = 41.50, df = 12, $p < .001$) further connoted a moderate degree of separation between the groups. The second function appears to offer less information based on the lower eigenvalue (1.74) and lower canonical correlation (.90). After some of the discriminating power

TABLE 14

Group Means and Standard Deviations for
Each Discriminating Variable for
Each of the Three Placement Groups with
Trainable Mentally Retarded Subsample

Variable	Size Option 1 (N=8)		Size Option 2 (N=5)		Size Option 3 (N=8)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	14.25	4.53	11.80	3.70	12.00	4.75
Gender	1.38	.52	1.80	.45	1.13	.35
IQ	34.38	12.34	38.20	4.76	24.13	7.61
Related Services	1.03	.07	1.08	.11	1.03	.07
School Climate	98.00	.00	98.00	.00	95.88	6.01
Teacher Effectiveness	63.00	.00	63.00	.00	61.38	4.60
Administrative Leadership	47.00	.00	47.00	.00	45.63	3.89
District Economic Level	691.25	130.06	779.40	67.59	692.00	96.47
School	60.00	.00	60.00	.00	62.50	7.07
Percent IEP Reading Objectives Completed	.63	.33	.19	.22	.22	.20
Percent IEP Math Objectives Completed	.41	.50	.37	.41	.13	.25
Percent IEP Behavioral Objectives Completed	.52	.38	.30	.45	.29	.25

was removed by placing variables into the first discriminant function, lambda increased to .37 and the chi-square was significant but lower (χ^2 = 15.61; df = 5, p = .01). Furthermore, the percent of variance in the first function was (61%) considerably higher than the second function (38%).

The group centroids for the three placement categories are as follows: Option 1 = 2.03, Option 2 = .06, Option 3 = 2.07. The centroids for the second function are: Option 1 = 1.35, Option 2 = 2.33, Option 3 = .11. It appears that the first discriminant provided a more pronounced separation between the groups than the second discriminant. In addition, on the first discriminant variate, the centroids for the three placement conditions were about equally placed, Option 1 and Option 3 were equidistant from Option 2. On the second discriminant, the centroids for the three placement conditions were not equally placed, with both Options 1 and 3 having negative means.

Table 15 presents the classification routine which classified the original set of cases to see how many were correctly classified by the variables used. Approximately 50% of the cases were correctly classified by the classification routine as members of the group to which they actually belonged, with

approximately 33% of the youngsters in Option 1 misclassified to Option 2. Approximately 61% of the youngsters in Option 2 were misclassified into Option 1 and 20% of the youngsters in Option 3 misclassified into Option 2.

Table 15

Classification Results for Three Placement Groups
for the Learning Disabled Subsample

Actual Group	N of Cases	Predicted Group Membership Option 1	Option 2	Option 3
Option 1 (1:12)	63	57.1%	33.3%	9.5%
Option 2 (1:1:12)	44	61.4%	27.3%	11.4%
Option 3 (1:1:6)	25	8.0%	20.0%	72.0%

Percent of "Grouped" Cases Correctly Classified: 50%

SUMMARY AND CONCLUSIONS

Research Question 5 asked what factors (such as school, family, student and achievement variables) contribute to or discriminate type of placement in special education settings?

Results Across Handicapping Conditions

To examine this question, the stepwise discriminant analysis procedure was employed with the entire sample and with each handicap group (TMR, EMR, EH and LD) using the entire set of discriminating variables. This procedure was used to distinguish between those youngsters who were placed in one of three placement options (1:12, 1:1:12 and 1:1:6). Table 16 summarizes the findings of these analyses.

Twelve variables, age, gender, handicap, school climate, teacher effectiveness, administrative leadership, district economic level, school, percent of IEP reading, mathematics and behavioral objectives completed and utilization of related services appeared to discriminate among the three groups for the entire sample. The contributions of these 12 discriminating variables to the discriminant function were represented primarily by school climate and teacher effectiveness with the other variables appearing as secondary components.

Those youngsters who were placed in size Option 1 (1:12) appeared to have higher scores on the school climate and teacher effectiveness rating variables than those youngsters who were placed in the other placement options, size Option 2 and 3, respectively. With those youngsters in size Option 3 scoring lowest on these two variables.

TABLE 16

Summary Table of Discriminant Analysis Variables that Discriminate to Option 1, 2, 3

Sample	Significant Discriminating Variables	Standardized Canonical Coefficient	Final Wilks' Lambda	Eigenvalue	Canonical Correlation
Entire	School Climate	2.4037	.3886	1.1057	.7246
	Teacher Effectiveness	-1.6537			
	Age	.4346			
	Administrative Leadership	-.2867			
	District Economic Level	.2355			
	Handicap	.2019			
	Percent Math Goals Completed	-.1737			
	Percent Behavior Goals Completed	.1297			
	School	.0964			
	Percent Reading Goals Completed	.0961			
	Related Services	.0590			
	Gender	.0305			
Emotionally Handicapped	School Climate	3.6858	.1881	2.7530	.8565
	Teacher Effectiveness	-2.6798			
	Age	.4644			
	Administrative Leadership	.4002			
	Percent Math Goals Completed	-.2707			
	School	.2504			
	Percent Reading Goals Completed	.2389			
	District Economic Level	.1155			
Learning Disabled	School Climate	1.6903	.3288	1.2309	.7428
	Administrative Leadership	.9063			
	Age	.5164			
	Percent Behavior Goals Completed	.3425			
	School	.2408			
	Teacher Effectiveness	-.2336			
	District Economic Level	.1652			
	Gender	-.0674			
	Percent Reading Goals Completed	.0022			

TABLE 16

Summary Table of Discriminant Analysis Variables that Discriminate to Option 1, 2, 3

Sample	Significant Discriminating Variables	Standardized Canonical Coefficient	Final Wilks' Lambda	Eigenvalue	Canonical Correlation
Continued					
Educable Mentally Retarded	IQ	.5941	.4526	.7371	.6514
	Age	.5763			
	Administrative Leadership	.4986			
	District Economic Level	.4916			
	Related Services	.2471			
	Percent Reading Goals Completed	.2359			
Trainable Mentally Retarded	IQ	1.6157	.0687	4.3122	.9010
	Percent Reading Goals Completed	1.4668			
	Age	1.0052			
	District Economic Level	.7091			
	Gender	-.5560			
	Percent Math Goals Completed	-.1422			

These two variables (school climate and teacher effectiveness) discriminate among the three placement groups. The school climate and teacher effectiveness rating variables played a statistically significant role in discriminating among the three educational placement groups. It appeared that their degree of discriminating power was relatively high.

Results for Each Handicap Group

A stepwise discriminant procedure was also employed with each handicap group (EMR, TMR, LD and EH) with the entire set of potential discriminating variables. This procedure was used to distinguish between those youngsters who were placed in one of the three placement options (1:12, 1:1:12, and 1:1:6).

Emotionally Handicapped Group

The data revealed that eight variables, school climate, teacher effectiveness, administrative leadership, age, school, percent IEP math and reading objectives completed and district economic level appeared to discriminate among the three groups for the emotionally handicapped sample. The contributions of these eight discriminating variables to the discriminant function were represented primarily by school climate and teacher effectiveness, with the other variables appearing as secondary components.

Those EH youngsters who were placed in size Option 1 (1:12) appeared to have higher scores on the school climate and teacher effectiveness rating variables than those youngsters who were placed in size Options 2 and 3, respectively; again with those youngsters in size Option 3 scoring the lowest on these two variables. These two variables (school climate and teacher effectiveness) discriminate or distinguish among the three placement groups in a statistically significant way for the EH youngsters.

Learning Disabled Group

The data revealed that ten variables: school climate, age, school, administrative leadership, teacher effectiveness, related services utilized, percent of IEP behavioral and reading objectives completed, district economic level and gender appeared to discriminate among the three groups for the learning disabled sample. The contributions of these seven discriminating variables to the discriminant function were represented primarily by school climate, administrative leadership and age, with the other variables appearing as secondary components.

Those LD youngsters who were placed in size Option 1 (1:12) appeared to have higher scores on the school climate and administrative leadership rating variables than those youngsters who were placed in size Options 2 and 3. In addition, age tended to discriminate between the LD group placements, with the older youngsters (mean age - 14 years) being placed in size Option 1 and the younger LD students (mean age - 11 years and 9 years) being placed in size Options 2 and 3, respectively.

These three variables (school climate, administrative leadership and age) discriminate among the three placement groups in a significant way for LD youngsters.

Educable Mentally Retarded

The data revealed that six variables: age, related services utilized, administrative leadership, district economic level, IQ and percent IEP reading objectives completed appeared to discriminate among the three groups for the educable mentally retarded group. The contribution of these six variables to the discriminant function were represented primarily by IQ, age, administrative leadership and district economic level.

Those EMR youngsters who were placed in size Option 1 (1:12), appeared to have higher mean IQ scores (IQ = 60) and were older (mean age = 16 years) than those EMR youngsters placed in size Options 2 and 3, respectively (IQ = 53; mean age = 14 years) (IQ = 49, mean age 12 years). Furthermore, district budgetary figures appeared to be higher for those EMR youngsters in size Option 1 than for size Options 2 and 3 respectively. Lastly, the administrative leadership rating by teachers was higher for the size Option 1 group than for size Option 2 and 3 groups, respectively.

In summary, it appears that for the EMR group that IQ and age tended to discriminate among the placement options more so than with the other handicapped groups.

Though these variables played a statistically significant role in discriminating among the educational placement groups for the EMR students, it appeared that their degree of discriminating power was relatively low.

TMR Group

The data revealed that six variables: percent IEP reading objectives completed, IQ, gender, age, district economic level and percent IEP mathematics objectives completed appeared to discriminate among the three groups for the trainable mentally retarded group. The contributions of these six discriminating variables to the discriminant function were represented primarily by IQ, percent IEP reading objectives completed and age.

The TMR youngsters who were placed in size Option 1 (1:1:12) appeared to have higher mean IQ scores (IQ = 38.20) than those TMR youngsters placed in size Options 2 and 3, respectively (IQ = 34.38) and (IQ = 24.13). In addition, age tended to discriminate between the TMR group placements, with the older youngsters (mean age = 14.25 years) being placed in size Option 1 (1:12) and the slightly younger TMR students (mean age = 11.80 and 12.00 being placed in size Options 2 and 3, respectively.

Furthermore, percent of reading objectives completed tended to discriminate between the TMR group placements, with the higher percent of reading objectives completed for those youngsters in size Option 1 as compared to size Options 2 and 3.

These three variables (IQ, percent IEP reading objectives completed and age) statistically discriminate among the three placement groups for TMR youngsters.

RESEARCH QUESTION 6

What factors contribute significantly and predict excellence in special education programs using student achievement as the criterion of excellence?

METHOD

In order to determine the best set of variables to predict reading, mathematics and behavioral achievement levels for special education students in the entire sample and in each of the handicapping conditions, the statistical technique known as multiple regression was employed. The statistical techniques of multiple regression are used to obtain a prediction equation that indicates how scores on the independent variables can be weighted and summed so that the best possible prediction of achievement levels in reading, mathematics and behavior for the sample of special education students can be made. The regression technique not only indicates how accurate the predictor equation is, but how much of the variation in achievement levels are accounted for by the joint influences of the predictor variables.

Sample

The sample used for the multiple regression for Research Question 6 is the same as described above for Research Questions 4 and 5.

Data Analysis

To determine which of the ten predictor variables contributed significantly to predict the criterion variables (namely achievement levels in behavior, reading and mathematics on standardized tests and the percent of completed IEP objectives in each of three goal areas: reading, mathematics and behavior), separate multiple regressions were calculated for the entire sample and for each handicapping group.

RESULTS

Criterion Variables: Standardized Reading and Mathematics Achievement Levels and Behavioral Quotient

Entire Sample Results

The first set of multiple regression analyses examines which of the 10 variables predict behavior, reading and mathematics achievement levels for the entire sample.

Table 17 shows the means, and standard deviations for the 10 predictors and the criterion variables (Behavioral Quotient, Reading and Mathematical Levels) for the entire sample. The 10 predictor variables included in the analysis are: age, sex, IQ, handicapping condition, parent involvement, number of related

services utilized, school climate, teacher effectiveness, administrative leadership, and district economic level.

A step-wise selection was used to examine which of the predictor variables contributed significantly to predict the criterion variables. Correlations of all of the independent variables with the dependent variables were calculated and presented in Table 18.

The independent (predictor) variables that had the highest zero-order correlation with the dependent variable is entered into the analysis first. At each step, a partial correlation is completed and the variable that makes the greatest increment to R is entered, provided that the f-ratio associated with it exceeds the pre-specified F, for the entering variable. The contribution of each of the variables in the equation is re-examined at each step of the analysis and a determination is made whether to remove a variable or add a variable.

Table 19 is a summary of the various steps taken in the present analysis. The table is set up to describe each variable entered into the equation at each step.

The results of the step-wise selection indicated that at the first step, handicapping condition had the highest zero-order correlation with the behavioral quotient score. R is the same as the zero-order correlation, ($R = .16$) and the F ratio was statistically significant ($F = 9.02$, $df = 1/335$, $p = <.001$). The meaningfulness of the variable is expressed by r^2 ($r^2 = .026$). Therefore, the variable, handicapping condition, has a low positive correlation with the Behavioral Quotient criterion variable and accounts for approximately 3% of the explained variance in this dependent variable.

The second variable that entered the equation was school climate. This variable was statistically significant ($F = 8.37$, $df = 2/334$, $p < .001$) and had a multiple correlation of $R = .22$. There is a low positive relationship between school climate and the Behavioral Quotient criterion variable. When school climate was added to handicapping condition, there was a change in the explained variance. Approximately 5% ($r^2 = .047$) of these two variables account for the explained variances of the Behavioral Quotient criterion variable.

At the third step of the equation, related services was entered with a statistically significant F ($F = 7.55$, $df = 3/333$, $p < .001$). $R = .25$ indicates a low positive correlation between related services and the Behavioral Quotient criterion variable. The $r^2 = .063$, which indicates that the three variables account for approximately 6% of the variance in the Behavior Quotient criterion variable. Related services, such as counseling, accounted for an additional 1% of the variance in the Behavioral Quotient.

At the fourth and last step of the selection, IQ was entered, with a statistically significant F ($F = 6.78$, $df = 4/332$, $p < .001$). The $R = .27$, which indicates a low positive relationship between IQ and the Behavioral Quotient. IQ contributed less than .5% additional meaning to the explained variance of the Behavioral Quotient ($r^2 = .076$). The four variables accounted for 7.5% of the explained variance in the Behavioral Quotient.

The variables which did not have statistically significant ratios and therefore could not be entered into the equation were age, sex, parent involvement, teacher effectiveness, administrative leadership, and district economic levels.

A step-wise selection was then used to find the best predictor variables for reading achievement level for the entire sample. The results of this analysis are presented in Table 20.

At the first step of the equation, IQ had the highest zero-order correlation. R was the same as the zero-order correlation ($R = .50$) and the F ratio was 35.87, with 1 and 103 degrees of freedom ($p < .001$). There was a moderately high and positive correlation between IQ and reading achievement level, $r^2 = .258$. IQ accounts for approximately 26% of the explained variable in reading achievement level scores. This variable seems to explain a sizeable amount of the variance in reading achievement and seems to be in accordance with prior research with non-handicapped students.

Age was the next variable entered at the second step, with a statistically significant F ratio ($F = 34.30$, $df = 2/102$, $p < .001$). The multiple correlation of age and reading level achievement is positive and relatively high ($R = .62$). The $r^2 = .40$, which indicates that 40% of the explained variance in reading achievement level is accounted for by IQ and age. Age accounts for an additional 14% of the explained variance in reading achievement level.

At the third step of the equation, administrative leadership was entered with a statistically significant F ($F = 25.51$, $df = 3/101$, $p < .001$). There was a positive and relatively high correlation ($R = .66$) between administrative leadership and reading achievement level. The $r^2 = .431$, which indicated that the three variables (age, IQ and administrative leadership) accounted for approximately 43% of the explained variance in reading achievement. This latter predictor explained approximately 3% more of the variance in reading achievement.

None of the other variables reached a significant F and therefore were not entered into the equation. Those variables that were not entered into the equation were sex, handicapping condition, parent involvement, related services, school climate, teacher effectiveness, and district economic level. (See Table 18)

Another multiple regression analysis was calculated using a step-wise selection to find the best set of predictor variables for mathematic achievement level. The results of these analyses are presented in Table 21.

As indicated in Table 21, at the first step of the selection, IQ was entered with the highest zero-order correlation and a statistically significant F ratio ($F = 11.47$, $df = 1/99$, $p < .001$). The multiple correlation $R = .32$, which is the same as the zero-order correlation, indicated a low but positive relationship between IQ and mathematics achievement. The $r^2 = .103$ indicates that IQ accounts for approximately 10% of the explained variance in mathematics achievement level. IQ accounts for more of the explained variance in reading achievement level than in mathematics achievement level.

At the second step, age was entered into the equation with a statistically significant F ratio ($F = 12.13$, $df = 2/98$, $p < .001$). Age correlated moderately high with mathematics achievement ($R = .45$). The r^2 for both IQ and age was .198, which means that both IQ and age account for approximately 20% of the explained variance in mathematics achievement level. Age accounted for an additional 10% of the explained variance in mathematics achievement level.

At step three, administrative leadership was selected to enter into the equation, with a significant F ratio ($F = 10.16$, $df = 3/97$, $p < .001$). There is a moderately high positive correlation between administrative leadership and mathematics achievement ($R = .49$). The r^2 for the three variables (IQ, age and administrative leadership) is .215, which means that approximately 22% of the explained variance in mathematics achievement can be explained by these three variables. Administrative leadership explained approximately 2% more of the explained variance in mathematics achievement level.

None of the other variables achieved a significant F score to be entered into the equation. Those variables that did not enter into the equation are as follows: sex, handicapping condition, parent involvement, related services, school climate, teacher effectiveness, and district economic level.

To find the best set of predictor variables that would significantly contribute to the prediction of behavioral, reading and mathematics achievement levels for each of the four handicapping conditions, separate multiple regression analyses were calculated.

Emotionally Handicapped Subsample Results

Table 22 shows the variable means, standard deviations, and number of cases for the following variables: age, IQ, sex, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services for the emotionally handicapped subsample.

Table 23 presents the correlations calculated between the independent (predictor) variables and the dependent variables (Behavioral Quotient, reading and mathematics achievement levels).

The results of the first step-wise multiple regression analysis to find the best set of prediction variables of the Behavior Quotient for the emotionally handicapped subsample are presented in Table 24. The table is divided into two major parts: one for the variables included in the equation, and one for the variables not included in the equation.

The results of the step-wise selection indicate that age was entered at the first step with the highest zero-order correlation and a statistically significant F ratio ($F = 7.67$, $df = 1/55$, $p < .001$). Age had a low but positive correlation with behavior ($R = .22$). Age accounted for approximately 5% ($r^2 = .047$) of the explained variance of the Behavioral Quotient. This variable accounts for a very small portion of the explained variance.

At step two, administrative leadership was entered into the equation with a statistically significant F ratio ($F = 6.47$, $df = 2/154$, $p < .001$). There was a low positive correlation ($R = .28$) between administrative leadership and the Behavioral Quotient. When administrative leadership was added to age, the r^2 =

.077, which means that both age and administrative leadership accounted for approximately 8% of the explained variance of the Behavioral Quotient. Administrative leadership accounted for about 3% more of the explained variance in this dependent variable.

None of the other variables had a statistically significant F ratio; therefore, they were not entered into the equation. The variables not entered into the equation were: sex, IQ, parent involvement, school climate, teacher effectiveness, district economic level, and related services.

The second step-wise selection was used to examine the best set of predictor variables that contributed significantly to predict the reading achievement level for this subsample of emotionally handicapped students. The results of the analyses are presented in Table 25.

The result of the step-wise selection indicates that at step one, age had the highest zero-order correlation at this first step ($R = .50$) and a statistically significant F ratio (21.67), with 1 and 66 degrees of freedom ($p < .001$).

IQ was entered at the second step with a statistically significant F ratio ($F = 31.44$, $df = 2/65$, $p < .001$). IQ and achievement had a high positive correlation ($R = .70$). These results are similar to that of the entire sample. The r^2 indicated that age and IQ accounted for approximately 49% ($r^2 = .491$) of the explained variance in reading achievement level. The addition of IQ to the equation accounted for about another 24% of the explained variance in reading achievement level.

None of the other variables had a large enough F ratio to be significant, and thus they were not entered into the equation. Those variables that were not in the equation are as follows: sex, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services.

To find the best set of predictor variables for mathematics achievement level for the subsample of emotionally handicapped students, a multiple regression analysis using step-wise selection was calculated. The results of this analysis are shown in Table 26.

At the first step of this analysis, age was entered into the equation, which indicated that the variable had the largest zero-order correlation with mathematics achievement level. The R at the first step is the same as the zero-order correlation (.45) and the F ratio is 17.03, with 1 and 68 degrees of freedom ($p < .001$).

There is a positive moderate correlation between age and mathematic achievement level. The $r^2 = .20$, which indicates that approximately 20% of the explained variance in mathematics achievement level is accounted for by the students' ages.

At the second step, IQ was found statistically significant ($F = 12.33$, $df = 2/67$, $p < .001$) and was added to the equation. The multiple correlation R of .59 indicated a positive and moderately high correlation between IQ and mathematics

achievement level. The addition of the variable of IQ to the equation increased the r^2 to .267, indicating that approximately 27% of the explained variance in mathematics is accounted for by age and IQ. IQ accounted for approximately 7% more of the explained variance.

None of the other variables had a statistically significant F ratio, and therefore were not entered into the equation. The variables that did not enter into the equation are as follows: sex, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services.

In summary, age and IQ are predictor variables for both reading and mathematics achievement levels, whereas age and administrative leadership are predictor variables for the Behavior Quotient for the emotionally handicapped subsample.

Learning Disabled Subsample Results

In order to determine which of the nine predictor variables contributed significantly to the prediction of the criterion variables (Behavioral Quotient, reading and mathematics achievement levels) for the subsample of learning disabled students, multiple regression analysis was again calculated. The information presented in Table 27 gives the variable means, standard deviation, and number of cases for the learning disabled subsample.

Table 28 depicts the correlations of the predictor variables to the three dependent variables: Behavior Quotient, reading achievement level, and mathematic achievement level.

Then, a step-wise selection was used to determine which of the nine predictor variables would predict Behavioral Quotient for the learning disabled subsample. It was found that no variables were entered into the equation. None of the variables had a statistically significant F ratio.

Table 29 is the summary of the step taken in the step-wise selection of a multiple regression analysis to enter variables that predict reading achievement level for the learning disabled subsample.

As shown in Table 29, the step-wise selection of variables that predict reading achievement level for the learning disabled subsample revealed that age had the highest zero-order correlation with reading achievement. The F ratio ($F = 7.84$, $df = 1/27$, $p < .001$) for reading was statistically significant, and entered into the equation at the first step. Age had a positive and moderately high correlation with reading achievement level. The age of the student accounts for 23% ($r^2 = .235$) of the explained variance in reading achievement scores.

No other variables were selected to enter into this equation. None of the variables had a statistically significant F ratio. The variables not entered into the equation were: sex, IQ, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services.

Another step-wise selection was used to determine which predictor variables predict mathematics achievement level for the learning disabled subsample of students. Of the nine variables considered for the analysis, age was entered at the first step. As shown in Table 30, age had the highest zero-order correlation with mathematics achievement scores and a statistically significant F ratio ($F = 5.89$, $df = 1, 26$; $p = .02$). Age had a moderately high positive correlation ($R = .43$) with mathematics achievement level. The meaningfulness of the variable is noted by the r^2, which equals .185, which means that approximately 19% of the explained variance in mathematics achievement level can be accounted for by age.

At the second step of the equation, administrative leadership was entered. Administrative leadership has a statistically significant F ratio ($F = 6.36$, $df = 2, 25$; $p = .05$) and a multiple correlation R of .58, which means that there is a moderately high and positive correlation between administrative leadership and mathematics achievement level. When administrative leadership was added to age, the r^2 was .337, which means that approximately 34% of the explained variance in mathematics can be accounted for by both age and administrative leadership. Administrative leadership independently accounted for approximately 15% of the explained variance in mathematics achievement.

Educable Mentally Retarded Subsample Results

Table 31 shows the variable means, standard deviations, and number of cases for the nine predictor variables; namely age, sex, IQ, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services for the educably mentally retarded subsample.

Table 32 shows the intercorrelations of the predictor variables and the dependent variables; namely Behavioral Quotient, and reading and mathematics achievement levels calculated for the educable mentally retarded subsample.

Table 33 presents the summary of the steps taken in the multiple regression analysis which selected the variables that entered into the equation.

To determine which are the best set of predictor variables for Behavioral Quotient, reading and mathematic achievement levels for the educable mentally retarded sample of students, a multiple regression analysis was calculated using the step-wise method. The first step-wise selection attempted to enter the nine predictor variables to predict Behavioral Quotient for the educable mentally retarded students. The first predictor variable entered into the equation was parent involvement. Table 33 shows that parent involvement had a statistically significant F ratio ($F = 4.24$, $df = 1, 50$; $p = .05$). Parent involvement had a positive and relatively low correlation ($R = .28$) to behavioral achievement. The r^2 of .078 indicates that approximately 8% of the explained variance in the Behavioral Quotient can be accounted for by parent involvement.

Related services had a statistically significant F ratio ($F = 4.71$, $df = 2/49$, $p = .01$), and was entered into the equation at the second step. Related services had a positive, moderate correlation ($R = .40$) with the Behavioral Quotient. The addition of related services to parent involvement increased the r^2 to .16, which means that related services and parent involvement account for

approximately 16% of the explained variance in the Behavioral Quotient for the educable mentally retarded subsample.

No other variables were entered into the equation, as none reached a statistically significant F ratio. The variables not entered into the equation were: age, sex, IQ, school climate, teacher effectiveness, administrative leadership, and district economic level.

When the step-wise selection was calculated to determine which of the nine predictor variables would predict reading and mathematics achievement levels for the educable mentally retarded, it was found that none of the variables had a statistically significant F ratio.

A regression analysis could not be calculated for the trainable mentally retarded subsample, as they did not participate in the standardized testing program. Yet, Table 34 shows the variable means, standard deviations, and number of cases for the nine predictor variables for the TMR subsample. Table 35 shows the intercorrelations of these nine predictor variables for the TMR subsample.

Criterion Variables: IEP Objectives Completed in Reading, Mathematics and Behavioral Goal Areas:

Entire Sample Results

To determine which of the ten predictor variables predict the criterion variables. Namely, percent of IEP reading, mathematics and behavioral objectives completed, separate multiple regression analyses were calculated for the entire sample and for each of the four handicapping condition subsamples.

Table 36 shows the variable means, standard deviations, and number of cases of the ten predictor variables, and the criterion variables, percents of objectives achieved for reading, mathematics and behavior. The ten predictor variables include age, sex, IQ, handicapping condition, parent involvement, school climate, teacher effectiveness, administrative leadership, related services, and district economic level.

Table 37 shows the intercorrelations that were calculated between the predictor variables and the dependent variables for the entire sample.

First, multiple regression analyses were calculated to determine which of the ten aforementioned predictor variables contributed significantly to predict the criterion variables of percent of IEP reading objectives completed for the entire sample, as shown in Table 38.

The results of the step-wise selection found that the variable with the highest zero-order correlation was age. As noted in Table 38, which summarizes the steps taken to enter the variables into the equation, age was statistically significant ($F = 3.90$, $df = 1/335$, $p = .05$). The multiple correlation $R = 11$ indicated that there was a low positive correlation between age and percent of IEP reading objectives completed. Age accounted for approximately 1% of the explained variance in percent of reading objectives completed ($r^2 = .01$). This variable has very little impact on predictability for completing reading objectives.

None of the other variables had statistically significant F ratios; therefore, they were not entered into the regression equation.

The next step-wise selection examined which of the ten predictor variables were entered into the multiple regression equation for the criterion variable, percent of IEP mathematics objectives completed. Age had the highest zero-order correlation and had a statistically significant F ratio ($F = 6.37$, $df = 1/319$, $p = .01$). This is shown in Table 39, which summarizes the steps taken to enter the variables into the multiple regression equation.

Age had a positive but low correlation ($R = .14$), with percent of IEP mathematics objectives completed. None of the other variables were statistically significant, therefore, these variables were not entered into the multiple regression equation.

A third regression equation was calculated using a step-wise selection, to determine which of the predictor variables significantly contributed to predict the criterion variables, the percent of behavioral objectives completed for the entire sample.

The summary Table 40 shows the results of the analyses.

As presented in Table 40, handicapping condition had the highest zero-order correlation, and had a statistically significant F ratio ($F = 11.53$, $df = 1/335$, $p < .001$). The multiple correlation R indicated that handicapping condition had a low but positive correlation, with percent of IEP behavioral objectives completed ($R = .18$). Handicapping condition accounted for approximately 3% of the explained variance in the criterion variable. None of the other variables had statistically significant F ratios to enter in the multiple regression equation.

Separate multiple regression analyses were calculated to determine which of the nine predictor values significantly contributed to predict the criterion variables, percent of completed IEP reading, mathematics and behavioral objectives for each of the four handicapped conditions.

Emotionally Handicapped Subsample Results:

Table 41 shows the variable means, standard deviations and number of cases for each of the nine predictor variables, namely age, sex, IQ, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services and the criterion variables, percent of IEP reading mathematics and behavior objectives completed for the emotionally handicapped subsample.

Table 42 shows the intercorrelations calculated between the predictor variables and the criterion variables, namely, percent of reading, mathematics, and behavioral objectives completed for the emotionally handicapped subsample.

The steps taken in the multiple regression analysis to see which of the predictor variables entered into the equation to predict the percent of IEP reading, mathematics and behavioral objectives was completed for the subsample of emotionally handicapped students. The step-wise selection indicated that none of the predictor variables correlated highly with either percent of IEP

reading, mathematics or behavioral objectives completed for the emotionally handicapped subsample. When F ratios were calculated for each of the predictor variables, none of them were statistically significant. Therefore, none of the nine predictor variables were entered into the equation at any step.

Learning Disabled Subsample Results

A multiple regression analysis using a step-wise selection was performed to find the best of the nine predictor variables which made a significant contribution to predict the criterion variables, percent IEP reading, mathematic and behavior objectives completed for the learning disabled subsample.

Table 43 shows the variable means, standard deviations and number of cases for the nine predictor variables and the criterion variable completed of IEP reading, mathematics and behavioral objectives for the learning disabled subsample of students.

Table 44 shows the intercorrelations between the predictor variables and the criterion variables, percent of reading, mathematics and behavioral objectives completed for the learning disabled subsample.

The steps taken in the step-wise selection of variables for percent IEP reading objectives completed for the learning disabled subsample were calculated. None of the predictor variables had statistically significant F ratios, therefore, none of the variables were entered into the analysis.

Table 45 summarizes the steps taken in the step-wise selection of variables which are entered into the multiple regression equation for percent of IEP mathematics objectives completed for the learning disabled subsample. According to the findings in Table 45, age had the highest zero-order correlation with percent of IEP mathematics objectives completed, and had a statistically significant F ratio ($F = 6.14$, $df = 1/126$, $p = .02$). There is a positive but low correlation ($R = .22$) between age and percent of IEP mathematics objectives completed. Age accounts for approximately 5% ($r^2 = .046$) of the explained variance in percent of mathematics objectives completed.

None of the other variables had a statistically significant F ratio, therefore, they were not entered into the equation. Those variables not entered into the analysis are sex, IQ, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services.

The next multiple regression analysis that was calculated using a step-wise selection attempted to determine which of the nine predictor variables made a significant contribution to predict the percent of IEP behavior and objectives completed for the learning disabled subsample.

Table 46 summarizes the steps taken to enter or not to enter the predictor variables into the multiple regression equation for the criterion variable, percent of IEP behavioral objectives completed for the learning disabled subsample.

Table 46 indicated that at the first step, sex had the highest zero-order correlation with percent IEP behavioral objectives completed, and a

statistically significant F ratio (F = 4.40, df = 1/146, p = .04), and was therefore entered into the equation. Sex had a positive but low correlation (R = .18), with percent of behavioral objectives completed. This predictor variable accounted for approximately 3% (r^2 = .033) of the explained variance in percent of behavioral objectives completed.

Educable Mentally Retarded Subsample Results

Three separate multiple regression equations were calculated using the educable mentally retarded subsample to determine which of the same predictor variables contribute significantly to predict percent IEP reading, mathematics and behavioral objectives completed.

Table 47 shows the variable means, standard deviations, and number of cases for each of the predictor variables and the criterion variables for the subsample of educable mentally retarded students.

Table 48 shows the intercorrelations between the predictor variables and the criterion variables: percent of reading, mathematics and behavioral goals completed for the educable mentally retarded subsample.

Table 49 summarizes the steps taken to determine which predictor variables are entered and those variables that are not entered into the multiple regression equation for the educable mentally retarded subsample on percent of IEP reading objectives completed.

Table 49 indicates that IQ had the highest zero-order correlation with percent of IEP reading objectives completed. IQ accounts for approximately 15% (r^2 = .149) of the explained variance in percent of reading objectives completed. For the educable mentally retarded, their IQ level would be one predictor of their ability to complete reading objectives.

None of the other variables had statistically significant F ratios, therefore, those variables were not entered into the regression equation.

The next multiple regression equation was calculated using the step-wise selection to determine which of the nine predictor variables contributed significantly to predict the criterion variable, percent of IEP mathematics objectives completed. Table 50 summarizes the steps taken to determine which predictor variables are entered into the multiple regression equation.

Table 50 indicates that age had the highest zero-order correlation with percent of IEP mathematics objectives completed, and had a statistically significant F ratio (F = 4.26, df = 1/36, p = .05). Therefore, age was selected at the first step to be included in the equation. Age had a positive and moderate correlation R = 33 with percent of IEP mathematics objectives completed. Age accounted for approximately 11% (r^2 = .105) of the explained variability in the criterion variable. Educable mentally retarded students complete more of their mathematics objectives as they get older.

No other variables had a large enough F ratio to be entered into the equation, therefore, the following variables were not in the equation: sex, IQ, parent involvement, school climate, teacher effectiveness, administrative leadership, district economic level, and related services.

When a multiple regression analysis was calculated to determine which of the nine predictor variables could be used to predict the percent of IEP behavior objectives completed for the educable mentally retarded subsample, the step-wise selection did not choose any of the variables. The F ratio was not statistically significant, therefore none of the variables were selected to enter into the equation.

Trainable Mentally Retarded Subsample Results

The trainable mentally retarded subsample was used in a separate analysis to determine which of the eight predictor variables, namely, age, sex, IQ, school climate, teacher effectiveness, administrative leadership, district economic level, and related services, would predict the percent of the objectives completed in reading, mathematics and the behavioral area. Parent involvement was not used because it had missing values for this population.

Table 51 shows the variable means, standard deviations and number of cases for each of the eight predictor variables and criterion variable for the subsample of trainable mentally retarded students.

Table 52 shows the intercorrelations between the predictor variables and the criterion variables, namely, percent of IEP reading, mathematics and behavioral objectives completed for the subsample of trainable mentally retarded students.

The steps taken in determining which of the predictor variables were entered into the multiple regression analysis for percent of IEP reading objectives was completed. Analyses indicated that none of the predictor variables had statistically significant F ratios, therefore none of the variables were entered.

SUMMARY AND CONCLUSIONS

In summary, age and IQ were the best predictors of achievement of standardized reading and mathematics levels, whereas there was no one predictor that explained the variance for the behavioral quotient for the entire sample. On the other hand, none of the variables appeared to be strong predictors or contributed highly to the completion of IEP objectives in the reading, mathematics or behavior goal areas for the entire sample.

Presented below in Figures 2 and 3 are those predictors which explain a statistically significant amount of variance of the criterion variables (standardized achievement test and IEP objectives completed). Starred predictors (*) explain 10% or more of the variance of the criterion variable examined. Those predictors that are statistically significant but explain less than 10% of the variance are designated with an 'X'.

For predictors of standardized achievement for the entire sample, age and IQ predict most of the explainable variance. For the emotionally handicapped subsample, age and IQ are the strongest predictors of reading achievement, and age is the strongest predictor of math achievement. For the learning disabled subsample, age is the strongest predictor of reading and math achievement, and

administrative leadership is also a strong predictor of math achievement. (See Figure 2.)

For predictors of completed IEP objectives, there are no strong predictors that explain 10% or more of the variance for the entire sample. For the educable mentally retarded (EMR) subsample, IQ is a strong predictor of percent of IEP reading objectives completed, and age is a strong predictor of math objectives completed.

For the trainable mentally retarded (TMR) subsample, sending district budget is a predictor of math achievement.

Figure 2

Predictors of Standardized Achievement Tests

	Age	IQ	Hand. Cond.	School Climate	Admin. Lead.	Related Serv.	Parent Involvement
Entire Sample							
1. Behavioral Quotient		X	X	X		X	
2. Reading Achievement	*	*			X		
3. Math Achievement	*	*			X		
Subsamples							
Emotionally Handicapped (EH)							
1. Behavior Quotient	X				X		
2. Reading Achievement	*	*					
3. Math Achievement	*	X					
Learning Disabled (LD)							
1. Behavior Quotient	No significant predictors						
2. Reading Achievement	*						
3. Math Achievement	*				X		
Educably Mentally Retarded (EMR)							
1. Behavior Quotient						X	X
2. Reading Achievement	No significant predictors						
3. Math Achievement							
Trainable Mentally Retarded (TMR)							
1. Behavior Quotient	No significant predictors						
2. Reading Achievement							
3. Math Achievement							

Figure 3

Predictors of IEP Completed Objectives

	Sex	Age	IQ	Hand. Cond.	Sending District Budget
Entire Sample					
1. Behavioral				X	
2. Reading		X			
3. Math		X			
Subsamples					
EH					
1. Behavioral	No significant predictors				
2. Reading					
3. Math					
LD					
1. Behavioral	X				
2. Reading	No significant predictors				
3. Math		X			
EMR					
1. Behavioral	No significant predictors				
2. Reading			*		
3. Math		*			
TMR					
1. Behavioral	No significant predictors				
2. Reading					
3. Math					*

TABLE 17

Means and Standard Deviations: Predictors of Standardized Test Score Levels of Achievement in Behavior, Reading and Mathematics For The Entire Sample

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.315	4.126	1007
Sex	1.277	.447	1007
IQ	75.903	22.297	899
Handicapping Condition	1.937	1.050	1011
Parent Involvement	2.404	1.081	599
Related Services Utilized	1.079	.110	1194
School Climate	98.196	13.454	1364
Teacher Effectiveness	60.190	9.447	1364
Administrative Leadership	46.974	8.477	1364
District Economic Level	10.338	84.807	1178

TABLE 18

Intercorrelations of Predictor Variables and Criterion Variables
For the Entire Sample

CORRELATION	AGE	SEX	IQ	PREDICTOR VARIABLES HANDICAPPING CONDITION	PARENT INVOLVEMENT	RELATED SERVICES	SCHOOL CLIMATE
Age	1.000	.053	- .094	.048	- .232	- .017	.114
Sex		1.000	- .185	.191	.060	- .028	.072
IQ			1.000	- .822	- .204	.177	- .005
Handicapping Condition				1.000	.203	- .146	.046
Parent Involvement					1.000	.053	- .036
Related Services						1.000	.066
School Climate							1.000
Teacher Effectiveness							
Administrative Leadership							
District Economic Level							
Behavior Quotient							
Reading Level							
Mathematics Level							

CORRELATION	PREDICTOR VARIABLES (Continued) TEACHER EFFECTIVENESS	ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	CRITERION VARIABLES BEHAVIORAL QUOTIENT	READING LEVEL	MATHEMATICS LEVEL
Age	.071	.016	- .056	.075	.329	.276
Sex	.094	.058	.020	.053	.005	.037
IQ	- .129	- .003	- .087	- .075	.508	.322
Handicapping Condition	.198	.026	.118	.164	- .389	- .241
Parent Involvement	.005	- .052	- .012	.080	- .238	- .045
Related Services	.059	.010	- .083	- .138	.120	.053
School Climate	.883	.760	- .026	.152	- .090	- .093
Teacher Effectiveness	1.000	.468	- .020	.162	- .140	- .083
Administrative Leadership		1.000	- .033	.077	- .166	- .198
District Economic Level			1.000	- .007	- .104	- .005
Behavior Quotient				1.000	.143	.141
Reading Level					1.000	.608
Mathematics Level						1.000

TABLE 19

Summary Of Stepwise Regression Analysis For
Entire Sample On Behavioral Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Handicapping Condition	.1635	1/335	9.20	.00	.0261
2	School Climate Handicapping Condition	.2184	2/334 1/335	8.37	.00	.0477
3	Related Services School Climate Handicapping Condition	.2524	3/333 2/334 1/335	7.55	.00	.0637
4	IQ Related Services School Climate Handicapping Condition	.2748	4/332 3/333 2/334 1/335	6.78	.00	.0755

.05 Limits Reached

TABLE 20

Summary Of Stepwise Regression Analysis For
Entire Sample On Reading Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	IQ	.5082	1/103	35.87	.00	.2583
2	Age IQ	.6341	2/102 1/103	34.30	.00	.4021
3	Administrative Leadership Age IQ	.6566	3/101 2/102 1/103	25.51	.00	.4311

.05 Limits Reached

TABLE 21

Summary Of Stepwise Regression Analysis For
Entire Sample On Mathematics Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	IQ	.3222	1/99	11.47	.00	.1038
2	Age IQ	.4454	2/98 1/99	12.13	.00	.1984
3	Administrative Leadership Age IQ	.4890	3/97 2/98 1/99	10.16	.00	.2156

.05 Limits Reached

TABLE 22

Means and Standard Deviations: Predictors of Behavior, Reading and Mathematics Achievement For Emotionally Handicapped

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.884	3.515	456
Sex	1.208	.407	456
IQ	89.704	12.979	406
Parent Involvement	2.086	.973	174
School Climate	96.323	18.046	458
Teacher Effectiveness	57.939	12.525	458
Administrative Leadership	46.500	10.802	458
District Economic Level	698.662	90.451	458
Related Services Utilized	1.090	.104	458
Behavior Quotient	83.114	18.980	264
Reading Level	5.131	3.107	132
Math Level	4.354	2.401	135

TABLE 23

Intercorrelations of Predictor Variables and Criterion Variables
For the EH Subsample

CORRELATION	PREDICTOR VARIABLES						
	AGE	SEX	IQ	HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.066	- .023		- .240	.014	.095
Sex		1.000	- .035		- .013	.110	.105
IQ			1.000		.014	.034	.015
Parent Involvement					1.000	- .095	- .111
School Climate						1.000	.947
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Behavior Quotient							
Reading Level							
Mathematics Level							

CORRELATION	PREDICTOR VARIABLES (Continued)			CRITERION VARIABLES		
	ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	BEHAVIORAL QUOTIENT	READING LEVEL	MATHEMATICS LEVEL
Age	- .253	- .087	.003	.217	.497	.448
Sex	.066	.006	.029	.075	.079	.055
IQ	.075	- .006	.178	.102	.483	.252
Parent Involvement	- .053	- .044	.185	.038	- .146	.075
School Climate	.846	- .063	.108	.177	- .093	- .099
Teacher Effectiveness	.684	- .077	.119	.162	- .086	- .041
Administrative Leadership	1.000	- .050	.046	.114	- .164	- .225
District Economic Level		1.000	- .073	.000	- .079	.029
Related Services			1.000	- .108	.028	- .005
Behavior Quotient				1.000	.238	.223
Reading Level					1.000	.557
Mathematics Level						1.000

TABLE 24

Summary Of Stepwise Regression Analysis For
Emotionally Handicapped Subsample On
Behavioral Quotient

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.2171	1/155	7.67	.01	.0410
2	Administrative Leadership Age	.2783	2/154 1/155	6.47	.00	.0774

.05 Limits Reached

TABLE 25

Summary Of Stepwise Regression Analysis For
Emotionally Handicapped Subsample On
Reading Achievement Level

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.4971	1/66	21.67	.00	.2472
2	IQ Age	.7012	2/65 1/66	31.44	.00	.4916

.05 Limits Reached

TABLE 26

Summary Of Stepwise Regression Analysis For
Emotionally Handicapped Subsample On
Mathematics Achievement Level

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.4475	1/68	17.03	.00	.2003
2	IQ Age	.5186	2/67 1/67	10.32	.00	.2690

.05 Limits Reached

TABLE 27

Means and Standard Deviations: Predictors of Behavior, Reading and Mathematics Achievement For Learning Disabled Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	11.578	4.333	289
Sex	1.256	.437	289
IQ	81.173	11.820	255
Parent Involvement	2.429	1.092	147
School Climate	99.803	11.391	289
Teacher Effectiveness	63.422	6.725	289
Administrative Leadership	45.775	5.979	289
District Economic Level	715.372	80.860	288
Related Services Utilized	1.082	.121	289
Behavior Quotient	89.270	17.214	215
Reading Level	3.639	2.078	59
Math Level	4.078	1.708	51

TABLE 28

Intercorrelations of Predictor Variables and Criterion Variables
For the LD Subsample

CORRELATION	PREDICTOR VARIABLES AGE	SEX	IQ	HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.026	- .007		- .213	.502	.265
Sex		1.000	- .193		.095	.014	.058
IQ			1.000		- .150	- .044	- .086
Parent Involvement					1.000	- .134	- .049
School Climate						1.000	.851
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Behavior Quotient							
Reading Level							
Mathematics Level							

CORRELATION	PREDICTOR VARIABLES (Continued) ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES BEHAVIORAL QUOTIENT	READING LEVEL	MATHEMATICS LEVEL
Age	.574	- .031	- .011	.080	.474	.430
Sex	- .022	- .047	.023	.031	.037	.142
IQ	- .043	.133	.015	- .073	.062	.079
Parent Involvement	- .124	- .043	- .004	- .052	- .266	- .363
School Climate	.876	- .074	.002	.095	.267	.002
Teacher Effectiveness	.659	- .109	.061	.034	.139	- .078
Administrative Leadership	1.000	- .039	- .017	.036	.162	- .073
District Economic Level		1.000	- .195	- .017	.012	.063
Related Services			1.000	- .111	.266	.065
Behavior Quotient				1.000	.093	- .055
Reading Level					1.000	.602
Mathematics Level						1.000

TABLE 29

Summary Of Stepwise Regression Analysis For
Learning Disabled Subsample On
Reading Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.4742	1/27	7.84	.01	.2249

.05 Limits Reached

TABLE 30

Summary Of Stepwise Regression Analysis For
Learning Disabled Subsample On
Mathematics Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.4298	1/26	5.89	.02	.1847
2	Administrative Leadership Age	.5808	2/25 1/26	6.36	.05	.3373

.05 Limits Reached

TABLE 31

Means and Standard Deviations: Predictors of Behavior, Reading and Mathematics Achievement For Educable Mentally Retarded Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.454	3.744	130
Sex	1.400	.492	130
IQ	57.607	9.437	122
Parent Involvement	2.661	1.100	56
School Climate	97.885	3.980	131
Teacher Effectiveness	62.305	3.584	131
Administrative Leadership	47.282	3.402	131
District Economic Level	715.092	89.382	131
Related Services Utilized	1.072	.105	131
Behavior Quotient	90.210	17.091	81
Reading Level	1.648	1.211	23
Math Level	2.278	1.701	18

TABLE 32

Intercorrelations of Predictor Variables and Criterion Variables
For the Educable Mentally Retarded Subsample

CORRELATION	AGE	SEX	IQ	PREDICTOR VARIABLES: HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.031	.159		- .219	.044	.001
Sex		1.000	- .016		- .028	.032	- .112
IQ			1.000		- .298	.052	- .043
Parent Involvement					1.000	- .074	- .029
School Climate						1.000	.682
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Behavior Quotient							
Reading Level							
Mathematics Level							

CORRELATION	PREDICTOR VARIABLES (Continued): ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES: BEHAVIORAL QUOTIENT	READING LEVEL	MATHEMATICS LEVEL
Age	.035	.020	.026	- .074	- .427	- .585
Sex	.236	- .010	- .113	- .083	.048	- .048
IQ	.109	- .151	.003	.009	.571	.593
Parent Involvement	.042	- .282	.033	.280	.215	.749
School Climate	.608	.073	.016	.047	- .336	.102
Teacher Effectiveness	- .066	.033	.043	.156	- .071	.032
Administrative Leadership	1.000	.031	- .117	.021	.000	.163
District Economic Level		1.000	.094	- .099	- .290	- .307
Related Services			1.000	- .278	.326	.238
Behavior Quotient				1.000	- .126	.216
Reading Level					1.000	.840
Mathematics Level						1.000

TABLE 33

Summary Of Stepwise Regression Analysis For
Educable Mentally Retarded Subsample On
Behavioral Achievement

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Parent Involvement	.2796	1/50	4.24	.05	.0782
2	Related Services Parent Involvement	.4014	2/49 1/50	4.71	.01	.1611

.05 Limits Reached

TABLE 34

Means and Standard Deviations: Predictors of Behavior Quotient, Reading and Mathematics Achievement Level For Trainable Mentally Retarded Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	15.015	4.692	132
Sex	1.439	.498	132
IQ	35.259	11.444	116
Parent Involvement	.000	.000	0
School Climate	97.780	1.859	132
Teacher Effectiveness	62.742	1.733	132
Administrative Leadership	46.962	1.805	132
District Economic Level	728.773	74.533	132
Related Services Utilized	1.038	.082	132
Behavior Quotient	.000	.000	0
Reading Level	.000	.000	0
Math Level	1.000	.000	1

TABLE 35

Intercorrelations of Predictor Variables for the TMR Subsample

CORRELATION	AGE	SEX	IQ	PREDICTOR VARIABLES HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.007	- .259			.256	.295
Sex		1.000	.034			.113	.017
IQ			1.000			.027	.032
Parent Involvement					1.000		
School Climate						1.000	.722
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Behavior Quotient							
Reading Level							
Mathematics Level							

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CORRELATION	PREDICTOR VARIABLES (Continued) ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES BEHAVIORAL QUOTIENT	READING LEVEL	MATHEMATICS LEVEL
Age	.072	- .085	.006			
Sex	.146	.080	- .037			
IQ	.026	.171	- .126			
Parent Involvement						
School Climate	.723	.166	- .115			
Teacher Effectiveness	.046	.121	- .070			
Administrative Leadership	1.000	.127	- .103			
District Economic Level		1.000	- .033			
Related Services			1.000			
Behavior Quotient				1.000		
Reading Level					1.000	
Mathematics Level						1.000

TABLE 36

Means and Standard Deviations:
Predictor Variables on Percent Reading, Mathematics
and Behavioral Objectives Completed
For The Entire Sample

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.315	4.126	1007
Sex	1.277	.448	1007
IQ	75.903	22.297	899
Handicapping Condition	1.937	1.050	1011
Parent Involvement	2.404	1.081	599
School Climate	98.196	13.454	1364
Teacher Effectiveness	60.190	9.447	1364
Administrative Leadership	46.974	8.477	1364
Related Services Utilized	1.079	.110	1194
District Economic Level	710.338	84.807	1178
Percent Reading	.383	.393	827
Percent Mathematics	.375	.391	744
Percent Behavior	.293	.395	819

TABLE 37

Intercorrelations of Predictor Variables and Criterion Variables
For the Entire Sample

CORRELATION	PREDICTOR VARIABLES						
	AGE	SEX	IQ	HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.053	- .094	.048	- .232	.114	.071
Sex		1.000	- .185	.191	.060	.072	.094
IQ			1.000	- .822	- .204	- .005	- .129
Handicapping Condition				1.000	.203	.046	.198
Parent Involvement					1.000	- .036	.005
School Climate						1.000	.883
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Reading Level							
Mathematics Level							
Behavior Quotient							

CORRELATION	PREDICTOR VARIABLES (Continued)			CRITERION VARIABLES		
	ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	READING LEVEL	MATHEMATICS LEVEL	BEHAVIORAL QUOTIENT
Age	.016	- .056	- .017	- .107	- .140	.031
Sex	.058	.020	- .028	.047	- .024	.114
IQ	- .003	- .087	.177	.029	.101	- .154
Handicapping Condition	.026	.118	- .146	.009	- .018	.182
Parent Involvement	- .052	- .012	.053	.080	.006	.070
School Climate	.760	- .026	.066	- .031	- .079	.017
Teacher Effectiveness	.468	- .020	.059	.029	- .023	.069
Administrative Leadership	1.000	- .033	.010	- .043	- .075	- .009
District Economic Level		- .083	1.000	.022	- .005	- .092
Related Services		1.000		.027	- .020	- .030
Reading Level				1.000	.605	.465
Mathematics Level					1.000	.368
Behavior Quotient						1.000

TABLE 38

Summary Of Stepwise Regression Analysis For
Entire Sample on Percent IEP
Reading Objectives Completed

Step	VARIABLES IN EQUATION Variables Entered	R	df	F	P	r^2
1	Age	.1072	1/335	3.90	.05	.0115

TABLE 39

Summary Of Stepwise Regression Analysis For
Entire Sample On Percent IEP
Mathematics Objectives Completed

Step	VARIABLES IN EQUATION Variables Entered	R	df	F	P	r^2
1	Age	.1399	1/319	6.37	.01	.0195

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TABLE 40

Summary Of Stepwise Regression Analysis For
Entire Sample On Percent IEP
Behavioral Objectives Completed

Step	VARIABLES IN EQUATION Variables Entered	R	df	F	P	r^2
1	Handicapping Condition	.1824	1/335	11.53	.00	.0332

.05 Limits Reached

TABLE 41

Means and Standard Deviations: Predictors of Percent Reading, Mathematics and Behavior Goals Completed For Emotionally Handicapped Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.884	3.515	456
Sex	1.208	.407	456
IQ	89.704	12.979	406
Parent Involvement	2.086	.973	174
School Climate	96.323	18.046	458
Teacher Effectiveness	57.939	12.525	458
Administrative Leadership	46.500	10.802	458
District Economic Level	698.662	90.451	458
Related Services Utilized	1.090	.104	458
Percent Reading	.346	.419	386
Percent Mathematics	.333	.392	353
Percent Behavioral	.219	.348	388

TABLE 42

Intercorrelations of Predictor Variables and Criterion Variables
For the Emotionally Handicapped Subsample

CORRELATION	AGE	SEX	IQ	PREDICTOR VARIABLES HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.066	- .023		- .240	.014	.095
Sex		1.000	- .035		- .013	.110	.105
IQ			1.000		.014	.034	.015
Parent Involvement					1.000	- .095	- .111
School Climate						1.000	.947
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Reading Level							
Mathematics Level							
Behavior Quotient							

CORRELATION	PREDICTOR VARIABLES (Continued) ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES READING LEVEL	MATHEMATICS LEVEL	BEHAVIOR QUOTIENT
Age	- .253	- .087	.003	- .127	- .064	.048
Sex	.066	.006	.029	.000	- .014	.124
IQ	.075	- .006	.178	.000	.040	.035
Parent Involvement	- .053	- .044	.185	.038	.059	.094
School Climate	.846	- .063	.108	- .052	- .104	- .002
Teacher Effectiveness	.684	- .077	.119	- .018	- .091	.010
Administrative Leadership	1.000	- .050	.046	- .041	- .041	- .026
District Economic Level		1.000	- .073	.017	- .019	- .024
Related Services			1.000	.059	.025	- .044
Reading Level				1.000	.676	.521
Mathematics Level					1.000	.384
Behavior Quotient						1.000

TABLE 43

Means and Standard Deviations: Predictors of Percent Reading, Mathematics and Behavioral Goals Completed For Learning Disabled Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	11.578	4.333	289
Sex	1.256	.437	289
IQ	81.173	11.820	255
Parent Involvement	2.429	1.092	147
School Climate	99.803	11.391	289
Teacher Effectiveness	63.422	6.725	289
Administrative Leadership	45.775	5.979	289
District Economic Level	715.372	80.860	288
Related Services Utilized	1.082	.121	289
Percent Reading	.460	.349	260
Percent Mathematics	.492	.369	249
Percent Behavioral	.326	.408	257

TABLE 44

Intercorrelations of Predictor Variables and Criterion Variables
For the Learning Disabled Subsample

	PREDICTOR VARIABLES						
CORRELATION	AGE	SEX	IQ	HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.026	- .007		- .213	.502	.265
Sex		1.000	- .193		.095	.014	.058
IQ			1.000		- .150	- .044	- .086
Parent Involvement					1.000	- .134	- .049
School Climate						1.000	.851
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Reading Level							
Mathematics Level							
Behavior Quotient							

	PREDICTOR VARIABLES (Continued)			CRITERION VARIABLES		
CORRELATION	ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	READING LEVEL	MATHEMATICS LEVEL	BEHAVIOR QUOTIENT
Age	.574	- .031	- .011	- .062	- .216	.033
Sex	- .022	- .047	.023	.136	.087	.184
IQ	- .043	.133	.015	.005	.088	- .091
Parent Involvement	- .124	- .043	- .004	.147	- .010	.021
School Climate	.876	- .074	.002	- .027	- .132	.014
Teacher Effectiveness	.659	- .109	.061	.074	- .026	.044
Administrative Leadership	1.000	- .039	- .017	- .030	- .143	.034
District Economic Level		1.000	- .195	.056	- .004	- .080
Related Services			1.000	.011	- .020	- .059
Reading Level				1.000	.514	.337
Mathematics Level					1.000	.235
Behavior Quotient						1.000

TABLE 45

Summary Of Stepwise Regression Analysis For
Learning Disabled Subsample On Percent
IEP Mathematics Objectives Completed

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.2155	1/126	6.14	.02	.0464
2	NONE					

TABLE 46

Summary Of Stepwise Regression Analysis For
Learning Disabled Subsample On Percent
IEP Behavioral Objectives Completed

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Sex	.1836	1/126	4.40	.04	.0337
2	NONE					

.05 Limits Reached

TABLE 47

Means and Standard Deviations: Predictors of Percent Reading, Mathematics and Behavioral Goals Completed For Educable Mentally Retarded Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	13.454	3.744	130
Sex	1.400	.492	130
IQ	57.607	9.437	122
Parent Involvement	2.661	1.100	56
School Climate	97.885	3.980	131
Teacher Effectiveness	62.305	3.584	131
Administrative Leadership	47.282	3.402	131
District Economic Level	715.092	89.382	131
Related Services Utilized	1.072	.105	131
Percent Reading	.380	.408	86
Percent Mathematics	.267	.378	86
Percent Behavioral	.408	.447	113

TABLE 48

Intercorrelations of Predictor Variables and Criterion Variables
For the Educable Mentally Retarded Subsample

CORRELATION	AGE	SEX	IQ	PREDICTOR VARIABLES HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.031	.159		- .219	.044	.001
Sex		1.000	- .016		- .028	.032	- .112
IQ			1.000		- .298	.052	- .043
Parent Involvement					1.000	- .074	- .029
School Climate						1.000	.682
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Reading Level							
Mathematics Level							
Behavior Quotient							

CORRELATION	PREDICTOR VARIABLES (Continued) ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES READING LEVEL	MATHEMATICS LEVEL	BEHAVIOR QUOTIENT
Age	.035	.020	.026	.146	.325	- .094
Sex	.236	- .010	- .113	- .047	- .204	- .164
IQ	.109	- .151	.003	.387	.298	.125
Parent Involvement	.042	- .282	.033	.131	- .081	.022
School Climate	.608	.073	.016	- .018	.014	.033
Teacher Effectiveness	- .066	.033	.043	.059	.091	.158
Administrative Leadership	1.000	.031	- .117	.015	- .061	- .062
District Economic Level		1.000	.094	- .010	.072	- .105
Related Services			1.000	- .037	- .165	- .270
Reading Level				1.000	.574	.537
Mathematics Level					1.000	.636
Behavior Quotient						1.000

TABLE 49

Summary Of Stepwise Regression Analysis For
Educable Mentally Retarded Subsample On Percent
IEP Reading Objectives Completed

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	IQ	.3869	1/36	6.34	.02	.1497

TABLE 50

Summary Of Stepwise Regression Analysis For
Educable Mentally Retarded Subsample On Percent
IEP Mathematics Objectives Completed

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	Age	.3252	1/36	4.26	.05	.1057

.05 Limits Reached

TABLE 51

Means and Standard Deviations: Predictors for Percent IEP Reading, Mathematics and Behavioral Objectives Completed For Trainable Mentally Retarded Subsample

VARIABLE	MEAN	STD. DEV.	CASES
Age	15.015	4.692	132
Sex	1.439	.498	132
IQ	35.259	11.444	116
Parent Involvement	.000	.000	0
School Climate	97.780	1.859	132
Teacher Effectiveness	62.742	1.733	132
Administrative Leadership	46.962	1.805	132
District Economic Level	728.773	74.533	132
Related Services Utilized	1.038	.082	132
Percent Reading	.325	.359	95
Percent Mathematics	.282	.376	56
Percent Behavioral	.404	.437	61

TABLE 52

Intercorrelations of Predictor Variables and Criterion Variables
For the Trainable Mentally Retarded Subsample

CORRELATION	PREDICTOR VARIABLES AGE	SEX	IQ	HANDICAPPING CONDITION	PARENT INVOLVEMENT	SCHOOL CLIMATE	TEACHER EFFECTIVENESS
Age	1.000	.007	- .259			.256	.295
Sex		1.000	.034			.113	.017
IQ			1.000			.027	.032
Parent Involvement					1.000		
School Climate						1.000	.722
Teacher Effectiveness							1.000
Administrative Leadership							
District Economic Level							
Related Services							
Reading Level							
Mathematics Level							
Behavior Quotient							

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CORRELATION	PREDICTOR VARIABLES (Continued) ADMINISTRATIVE LEADERSHIP	DIST. ECONOMIC LEVEL	RELATED SERVICES	CRITERION VARIABLES READING LEVEL	MATHEMATICS LEVEL	BEHAVIOR QUOTIENT
Age	.072	- .085	.006	- .042	.119	.229
Sex	.146	.080	- .037	.171	- .003	.115
IQ	.026	.171	- .126	- .017	- .180	- .227
Parent Involvement						
School Climate	.723	.166	- .115	- .031	- .003	.120
Teacher Effectiveness	.046	.121	- .070	- .023	.014	.120
Administrative Leadership	1.000	.127	- .103	- .034	- .009	.120
District Economic Level		1.000	- .033	.006	- .348	.023
Related Services			1.000	- .117	.010	.014
Reading Level				1.000	.396	.581
Mathematics Level					1.000	.494
Behavior Quotient						1.000

TABLE 53

Summary Of Stepwise Regression Analysis For
Trainable Mentally Retarded Subsample On Percent
IEP Mathematics Objectives Completed

VARIABLES IN EQUATION

Step	Variables Entered	R	df	F	P	r^2
1	District Economic Level	.2477	1/51	7.02	.01	.1209

.05 Limits Reached

CONCLUSION

There is increasing challenge to the current design, organization, and operation of special education. Some have challenged its basic conceptualization (Skrtic, 1986), others its organization (Gartner & Lipsky, 1987; Stainback & Stainback, 1984), still others its operation in practice (Wang, Reynolds & Walberg, 1985). Even the most vehement in attacking proposals for fundamental reform acknowledge that much needs to be done to improve the quality of education provided to students labelled as handicapped (Fuchs & Fuchs, 1988; Kauffman, Lloyd & McKinney, 1988). And whatever the value of these broad proposals for redesign, at bottom, issues of the quality of special education come down to matters involving the design and delivery of instruction to students, individually and collectively.

Purpose

This federally-funded study, "Factors Relating to Excellence in Special Education Using a Validated IEP Systems as an Outcome Variable," is addressed to these issues, seen in the context of the broader effort of education reform. It was conducted over a two-year period, 1986-1888, by Suffolk BOCES 2, in conjunction with LLW Associates. It was designed to: 1) derive lessons from the IEP data base developed by Suffolk BOCES 2; 2) identify appropriate measures of excellence in special education in terms of student outcomes; and, 3) disseminate these findings both within the BOCES system locally and to other school systems nationally.

Overall, the project had six objectives. They were:

Objective 1: To determine the degree of importance assigned to different IEP goals/objectives by different types of professionals in special education so that attainment of these goals and objectives can be used as measures of student achievement.

Objective 2: To determine the concurrent validity of the IEP assessment procedures against a set of standardized tests.

Objective 3: To determine the types of frequency of IEP objectives within major goal areas achieved by students of different ages with different handicapping conditions over a three-year period.

Objective 4: To determine if youngsters with similar characteristics and disabilities, who are placed in different special education settings, differ in level of achievement.

Objective 5: To determine what factors, such as school, family, student and achievement variables, contribute to or discriminate type of placement in special education setting.

Objective 6: To determine what factors contribute significantly, and predict excellence in special education programs using student achievement as the criterion of excellence.

The first three objectives were addressed in Year One of the project (1986-87), the latter three in Year Two (1987-88).

In the first year, three research questions were posed:

1) What degree of importance is assigned to different IEP objectives by different types of professionals in special education?

2) Is there a high correlation between results obtained from IEP assessment procedures and scores obtained on standard tests measuring comparable values (concurrent validity)?

3) What are the types and frequencies of objectives achieved for each academic and behavioral goal area over a three-year period for different age groups with different handicapping conditions?

In responding to Research Question 1, the views of two groups of persons were canvassed -- "internal experts", consisting of all 127 BOCES 2 teachers and administrators, and "external experts", consisting of 162 researchers, professors, teachers, and administrators drawn from the membership of the Council for Exceptional Children (CEC), The Association for Persons with Severe Handicaps (TASH), and the American Educational Research Association (AERA). These two groups of experts were asked to select from the Suffolk 2 IEP data base the five most important objectives for students of four age groups (5-7, 8-11, 12-15, 16+), categorized by four handicapping conditions (LD, EH, EMR, and TMR; the LD and EH groups were further divided into those with mild/moderate disabilities and those with severe disabilities), in three topical areas -- social-emotional objectives, reading objectives, and mathematics objectives.

Two sets of findings warrant particular note. The first concerns the specific research question -- namely, the degree of importance assigned to particular objectives, while the second set concerns the extent of overlap between the two groups of experts, and within specific handicapping conditions between the objectives for students of different ages and severity of disability.

In the social-emotional area for all handicapping conditions, at most age levels, the most important objective was "To increase interest and attention span in the classroom." For all four handicapping conditions, one of the five most important objectives was for students "Increasingly to demonstrate age appropriate behaviors in school." Four objectives were among the five most important for three of the four handicapping conditions: "To demonstrate appropriate listening skills" (all but EH), "To increase frustration tolerance" (all but EMR), "To reduce attention seeking behavior which disrupts teachers and interferes with class presentation", and "To accept responsibility for behavior" (all but LD).

Turning to the second set of findings, for LD students there was considerable overlap between the rankings of objectives by the two groups of experts ("internal" and "external"), high overlap between the ranking of objectives of those termed mild/moderate and those severely disabled, and high overlap between the ranking of objectives across age groups. For those labelled as EH, there was a moderate extent of overlap between the rankings of objectives by the two groups of experts, high overlap between the ranking of objectives for

those termed mild/moderate and those severely disabled, and high overlap across age groups. For both those labelled EMR and TMR, there was a moderate to high overlap between the rankings of the two groups of experts and a high overlap across age groups; in these two groups, there was no breakout between mild/moderate and severe. Beyond these overlaps, as to rankings of objectives within handicapping conditions, there was an interesting overlap between the objectives for the severe LD and EH by age groups.

In the reading area, for all handicapping conditions for several age groups, the most important objective was "To read suggested basic sight vocabulary." For all four handicapping conditions, three other objectives were selected as among the top five: "To arrange picture stories in sequence," "To identify pictorial sequence after being told a story," and "To match objectives by color/size/shape."

Turning to the second set of findings for all four handicapping conditions, there was a high degree of overlap in the ranking of objectives between the two groups of experts; for LD and EH, a high degree of overlap between the ranking of objectives for those termed mild/moderate and those severe. For LD and EH, there was a low degree of overlap in the ranking of objectives across age groups, while there was a high overlap here for those labelled EMR and TMR. And across categories, there was a high overlap by age group in the ranking of objectives for those labelled severe LD and EMR, and to a lesser extent TMR.

In the mathematics area, six objectives were ranked among the five most important for all handicapping conditions, generally for most age groups among the EMR and TMR categories, and for younger groups among the LD and EH categories. These are "To key time with hours and half-hours", "To demonstrate the value of coins," "To indicate one's age, address, and telephone", "To construct sets of four, five, six, ten objects," "To match number (0 to 10) with appropriate points on a number line," and "To demonstrate an understanding of the system of whole numbers by comparing sets of objects, by naming numbers and counting."

The second set of findings for mathematics mirrored those for reading. For all four handicapping conditions, there was a high degree of overlap in the ranking of objectives between the two groups of experts: for LD and EH, a high degree of overlap between the ranking of objectives for those termed mild/moderate and severe. For LD and EH, there was a low degree of overlap in the ranking of objectives across age groups, while there was a high overlap here for those labelled EMR and TMR. Again, there was a high overlap by age group in the ranking of objectives for those labelled severe LD and EMR, and to a lesser extent, TMR.

Research Question 2 was designed to test the relationship between IEP objectives completed and scores on standardized tests. For reading and mathematics, the number of objectives completed were correlated with scores on the Stanford Diagnostic Test; in the social-emotional area, objectives completed were correlated with Behavior Evaluation Scores (BES). For reading and mathematics, the correlations between students' mean grade equivalent scores and the percentage of objectives completed were generally low, though some were statistically significant. For the EMR group, there was the anomalous finding of a negative correlation between mean grade equivalent scores and the

percentages of objectives completed; in mathematics, the correlation was moderate and significant.

In the social-emotional area, there was a positive, generally moderate to high, and nearly always statistically significant correlation between objectives completed and BES.

Research Question 3 concerned the completion of objectives. For a three-year period, objectives completed were calculated by topic (reading, mathematics, and social-emotional), by handicapping condition, and by age group. In nearly all the cases, it was the youngest (5-7) age group that had the highest percentage of students who completed fifty or more percent of the objectives. In general, the lowest percentage of students who completed fifty or more percent of the objectives was the oldest group (16+). Comparing categories across all three topical areas, it was the TMR group that had the highest percentage of students who completed fifty or more percent of the objectives.

In the second year, three additional questions were posed:

1) Do youngsters with similar characteristics and disabilities who are placed in different special education settings differ in level of achievement?

2) What factors (such as school, family, student and achievement variables) contribute to or discriminate type of placement in special education settings?

3) What factors contribute significantly and predict excellence in special education programs using the student achievement as the criterion of excellence?

In responding to Research Question 4, the relationship between three different types of placement in special education settings and student achievement was examined for students with different handicapping conditions within different age groups.

The independent variable, type of placement, consisted of three types of size options, as follows:

* The Special Class Program - Size Option 1 is defined as the ratio of 1 teacher to 12 students. This program is designed for pupils whose special education needs require specialized instruction which can best be accomplished in a self-contained setting, for at least 50% of the school day, with other students having similar special educational needs.

* The Special Class Program - Size Option 2 is defined as the ratio of 1 teacher plus 1 paraprofessional to 12 students. In addition to the need for special education instruction, students in this program exhibit management needs which interfere with the instructional process to the extent that an additional adult is needed within the classroom to assist with the management needs of the pupils.

* The Special Class Program - Size Option 3 is defined as the ratio of 1 teacher plus 1 paraprofessional to 6 students. This program provides very individualized instruction. It offers the structure and the adult to student ratio necessary for the students whose management needs are determined to be highly intensive.

The dependent variable student achievement was measured by (1) percentage of IEP objectives completed in reading, mathematics and behavioral areas; and (2) standardized achievement test scores on the Stanford Diagnostic Test in reading and mathematics, and the behavioral quotient of the Behavioral Evaluation Scale.

The main finding from all of the analyses completed for Research Question 4 suggest that there does not appear to be consistent behavioral or achievement differences between the three placement groups across handicapping conditions or age groups. One interpretation is that if students are properly placed, they should proceed at a similar pace and at a similar level of achievement, regardless of placement options having different staff/student ratios.

Research Question 5 was designed to predict placement in specific special education settings (options), on the basis of student, parent, and school related variables, including the attainment of IEP objectives.

A step-wise discriminate analysis procedure was employed with the entire sample and with each handicap group (TMR, EMR, EH and LD) using a large set of discriminating variables. This procedure was used to distinguish between those youngsters who were placed in one of the three placement options (1:12, 1:1:12, and 1:1:6).

Two variables (school climate and teacher effectiveness) discriminated significantly among the three placement groups for the entire sample. It appeared that their degree of discriminating power was relatively high.

The same two variables (school climate and teacher effectiveness) also discriminated among the three placement groups in a statistically significant way for the EH youngsters.

Three variables (school climate, administrative leadership and age) discriminated among the three placement groups in a significant way for LD youngsters.

For the EMR group, IQ and age tended to discriminate among the placement options more so than with the other handicapped groups. Though these variables played a statistically significant role in discriminating among the educational placement groups for the EMR students, it appeared that their degree of discriminating power was relatively low.

Three variables (IQ, percent IEP reading objectives completed and age) statistically discriminated among the three placement groups for TMR youngsters.

Research Question 6 was designed to determine the best set of variables to predict reading, mathematics and behavioral achievement levels for special education students in the entire sample and in each of the handicapping conditions.

Results of the analyses indicated that age and IQ are the best predictors of achievement when standardized reading and mathematics test scores served as the criterion variables, whereas there is no one predictor that explained the variance for the behavioral quotient for the entire sample. On the other hand, none of the variables appeared to be strong predictors (explaining 10% or more of the variance) to achievement in reading, mathematics or behavior goal areas for the entire sample when completion of IEP objectives served as the dependent variable.

For the emotionally handicapped subsample, age and IQ are the strongest predictors of standardized reading achievement, and age is the strongest predictor of standardized math achievement. For the learning disabled subsample, age is the strongest predictor of standardized reading and math achievement, and administrative leadership is also a strong predictor of standardized math achievement.

For the educable mentally retarded (EMR) subsample, IQ is a strong predictor of percent of IEP reading objectives completed, and age is a strong predictor of math objectives completed.

For the trainable mentally retarded (TMR) subsample, sending district budget is a predictor of math achievement.

Discussion

Despite the importance of the IEP to the education of students in special education, it is noteworthy that in the past five years, among the more than one hundred articles in the field's leading research journal, Exceptional Children, only two have focused on the IEP. The groundbreaking nature of the current study is illustrated by the fact that none of the eight projects currently funded by the Division of Innovation and Development, Office of Special Education Programs, U.S. Department of Education, concerning the IEP cover as broad a set of issues or involve as large and complex a data base.

The purpose of Research Question 1 was to confirm the conceptual validity of the Suffolk BOCES 2 IEP system regarding the selection of appropriate and important objectives for students of various ages, handicaps, and degrees of disability. Three subsets of objectives (reading, mathematics and social/emotional), judged to be the most commonly emphasized academic goal areas across ages and handicapping conditions, were ranked in importance by BOCES 2 professionals and a group of external experts. For the most part, the two groups reached a high degree of agreement as to the ranking of objectives within these three goal areas for groups of students defined by handicapping condition, severity of handicap, and age. The extent of overlap between the two groups of experts attests to the conceptual validity of this foundational part of the BOCES 2 IEP system as it currently operates. On the other hand, the richness, variety, and flexibility of the total system which incorporates more than 13,000 major goals and innumerable individual long and short term objectives organized into more than 20 goal areas has not yet been tapped at this point in the validation process.

A secondary but equally interesting finding was the overlap in the ranked importance of specific objectives within these three goal areas for mild/moderate compared to severely affected students within handicapping condition and between some categories of handicapping conditions. At least in terms of relevant educational objectives, such an overlap reflects a sentiment expressed by educational practitioners and discussed increasingly in the research literature which questions current classification patterns in special education.

Research Question 2 tackled the problem of concurrent validity of the BOCES 2 IEP system. Again focusing on the three goal areas of reading, mathematics, and social/emotional behavior, completion of assigned IEP objectives was correlated with standardized achievement test scores. In the behavioral sphere, definite movement in the direction of concurrent validation was achieved. Positive, moderate to high, and nearly always statistically significant correlations were found between objectives completed and a standardized behavioral assessment. Additional studies using varied behavioral assessment instruments and further refinement of the criteria for judging completion of IEP objectives within the BOCES 2 behavior hierarchy should confirm this initial finding and increase the strength of the claim of validation for this component of the system.

Evidence of concurrent validity for the reading and mathematics hierarchies has not been established at this time. For reading and mathematics, correlations between students' mean grade equivalent scores and the percentage of objectives completed were generally low although some were statistically significant. While the results of this part of the study were disappointing, they should not be surprising for anyone familiar with the special education student. It is rare that handicapped students test well even when the testing modifications required by their IEPs are utilized. A standard approach to concurrent validation is the correlation of the instrument to be validated, in this case the BOCES 2 IEP reading and mathematics hierarchies, with some other accepted measure of the same performance, in this case the Stanford Diagnostic Test. However, the Stanford Diagnostic Test was developed and normed for a non-handicapped population. Norms for handicapped populations do not exist. The impact of testing modifications are unknown. In short, the lack of significant correlations may tell us more about the inappropriateness of standardized testing for this population than it does about the validity, or lack thereof, of the IEP system. This lack of adequate assessment devices for special populations has been noted by others (c.f. Bennett, 1983) and certainly hinders research efforts of the present kind.

Indeed, one of the purposes of the Individualized Educational Program is to circumvent standard measures of student progress which have been recognized as inappropriate for many children with handicapping conditions. The fact that high correlations between goal achievement and a standardized, but teacher rated rather than student completed, measure of student performance occurred for social/emotional goals gives us direction as to how future research to establish concurrent validity in other goal areas should proceed. Thus, the research provided valuable information which moves the process of concurrent validation forward.

Determining the extent to which assigned IEP objectives in reading mathematics, and social/emotional behavior are completed was the purpose of Research Question 3. As such it was an exploratory effort since no similar body of data exists in the research literature against which the results could be gauged. It was found that more than half of the students across handicapping conditions and ages completed at least 50% of their reading and mathematics objectives. A limitation to the current effort was the high attrition rate of students, by more than half, across the three years of the longitudinal study, which made other analyses aimed at explaining this general finding statistically impossible. Future research in the area of completion of IEP goals might include the question of whether the objectives completed coincide with the ones considered most important, indicating a concentration of effort on the part of individual teachers on those goals which are considered educationally most critical.

The relationship of student achievement and placement setting was explored in Research Question 4. A basic premise of the continuum of services offered by special education is that students have differing levels of need which can be addressed by educational settings which differ in level of restrictiveness. In theory, students with varying degrees of disability placed appropriately in educational settings of differing levels of restriction should proceed at similar rates toward achievement of their assigned goals and should reach similar levels of achievement within the limits of their handicapping condition. The main finding from all of the analyses completed for this part of the project suggest that there were no consistent behavioral or achievement differences between placement options having different staff/student ratios across the ages and handicapping conditions studied.

One interpretation of this finding is that it supports the current practice in special education of varying level of restrictiveness with perceived student need. An alternative interpretation is that varying student/teacher ratio, at least within the restricted range tested (i.e., the three class size options of 12:1, 12:1:1, 6:1:1), has no measurable impact on student achievement. Since cost of the service, as well as movement toward a currently popular ideal of mainstreaming for all, argues for larger rather than smaller class sizes, the issue becomes an important one. The current project hoped to elucidate this issue by matching students with similar characteristics and disabilities who had been placed in different class size options. Given the size and diversity of the BOCES 2 sample, this matching of students appeared to be a reasonable expectation when the study was planned. However, it eventually proved not to be a feasible methodology. Further research examining the impact of class size option on student achievement is indicated.

Research Question 5 extended the research base regarding critical determinants of placement in specific special educational settings. Earlier studies have found that such variables as IQ and parent variables such as intactness of family and familial support are better predictors of student placement than student characteristics such as level of achievement. The current study examined 13 predictors including student, parent, and school-related variables in order to see which related most strongly to placement in a specific class size option within the special education environment.

The analysis revealed that the variables of school climate and teacher effectiveness were the most important discriminators of class size option explaining the largest percent of variance between the three groups. Teachers assigned to the larger class size options had more positive feelings about the children's ability to learn, the safety of the school environment, and the effectiveness of the supervision, feedback, and training they receive. Given the correlational base of the statistical analysis performed, it is impossible to determine the direction of this relationship. Conceptually, it makes more sense to assume that having a larger class of more manageable, able students results in more positive teacher attitudes rather than the reverse (i.e., having more positive attitudes results in being assigned a larger class size of less impaired students). This is particularly true given the institution in which the study was conducted since teacher assignment is a decision made by the BOCES 2 administration while student placement within class size option is a decision made formally by the CSE of the student's home district though admittedly at the recommendation of the BOCES 2 professional staff. It is also the case that the statistical relationship between class size and teacher attitudes uncovered by the analysis could also have resulted from both being strongly related to a third unknown variable not included in the current study.

Although the study set out to examine predictors of student placement using a hierarchically coded IEP system as the measure of student achievement, this predictor did not prove to be significant as a discriminator of student placement. Arguably, this could be taken as an indication of the appropriate placement of students within the BOCES 2 system. After all, if students are failing to complete the specific IEP objectives they have been assigned, or at least failing at a greater rate than their peers, special educators begin to search for other environmental supports to invoke in order to help the student. If students are appropriately placed, their achievement should proceed at a similar rate. Moreover, if a student placed in a special education setting at a certain level of restrictiveness begins to show significant gains or improvement (i.e., gets his act together), the most typical reaction of the special educator would be to move that student to an educational setting of lesser restrictiveness along the continuum of service. Of course, all of this is speculative as is any discussion of a null result. It could equally be the case that no relationship between student placement and IEP achievement was noted because of some procedural problem such as inconsistencies on the part of teachers in determining whether certain IEP objectives were actually achieved.

The final research question (Research Question 6) concerned the factors which contribute significantly to the prediction of excellence in special education programs. The traditional predictors of achievement as assessed by standardized reading and mathematics tests, namely IQ and age, were borne out once again in the current study. As well as confirming former research in the area, this result gives some indication that the measures were operating in a valid way. No one predictor was identified as critical to scores on the standardized behavioral measure. Developers of the measure reported no correlation between age and scores on the measure so that at least in this respect the current sample follows the pattern of previous data. On the other hand, it is interesting to note that handicapping condition did not appear as a significant factor in prediction of behavioral ratings by teachers.

Turning to achievement as measured by completion of IEP objectives in reading, mathematics and behavior goal areas, only age appeared as a statistically significant predictor of reading and math achievement, though it explained so little of the variance as to be of questionable relevance. The fact that IQ did not relate to the percentage of IEP goals achieved is a positive sign, since proper selection of individual educational goals for a student theoretically takes this into account. However, many other factors could also explain what is essentially a no results finding. At the present time we have no clear explanation as to why some of the factors related to excellence in education, targeted by the effective schools literature, did not appear to relate to achievement by special education student in the current study as measured either by standardized testing or by IEP accomplishment. Clearly, this area is worthy of more intensive exploration in the future.

Implications

The results of this two year study have practical implications for special educators. The current research found a significant degree of overlap as to what experts considered appropriate educational objectives for those students designated as mildly/moderately or severely disabled within handicapping condition and some degree of overlap across handicapping conditions. This finding mirrors several sets of broader questions addressed in other studies including the validity and function of current student evaluation and classification (Ysseldyke, 1987); the overlap between the needs of students in various handicapped classifications (Jenkins, 1988); and the overlap between the needs of students labelled as handicapped and students in remedial programs (Allington & Johnston, 1986; Jenkins, 1988; Wang, Reynolds, & Walberg, 1987; Will, 1986). This latter area is addressed by the State Education Department's program to promote congruence as well as the efforts to promote "prevention."

The results of the present study also suggest future avenues of fruitful exploration. Although the traditional predictors found in studies of educational achievement were confirmed, no other significant predictors such as those noted in the effective school literature were found. A substantial research effort aimed at relating the tools of diagnosis, instruction, and evaluation in special education, in this study the process of assignment and achievement of IEP objectives, to the goals of education broadly defined as student outcomes is warranted. The emerging research on outcome-based education (Spady, 1988), as well as the ongoing work concerning instructional and school effectiveness may help to guide such an effort.

Finally, shifting from the topic to the location of such a research effort, the richness of data available through BOCES 2, in addition to the willingness and capacity of this institution to open the database to study, suggests an important role for intermediate units in offering sites and sponsorship of future research activities.

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